TNRCC

Protecting Texas by Reducing and Preventing Pollution

Expanded Site Inspection Work Plan

Gulfco Marine Maintenance, Inc.
Freeport, Brazoria County, Texas
TXD 055 144 539

REGION VI

Prepared in cooperation with the U.S. Environmental Protection Agency

January 2001

922352

003139

EXPANDED SITE INSPECTION WORK PLAN

Gulfco Marine Maintenance, Incorporated

Freeport, Brazoria County, Texas

TXD055144539

SIGNATURE PAGE

Johnny W. Kennedy
Texas Natural Resource Conservation Commission
Site Investigation Manager

1/8/01
Date

John C. Syer
Texas Natural Resource Conservation Commission
PA/SI Program Health and Safety Officer

1-12-01
Date

Allan M. Seils
Texas Natural Resource Conservation Commission
PA/SI Program Manager

01/12/01
Date

Wesley G. Newberry
Texas Natural Resource Conservation Commission
PA/SI Program Technical Director

1/12/01
Date

William Rhotenberry
U.S. Environmental Protection Agency

Date

Expanded Site Inspection Work Plan

Gulfco Marine Maintenance, Incorporated
Freeport, Brazoria County, Texas
TXD055144539

Prepared in cooperation with the

Texas Natural Resource Conservation Commission
and
U.S. Environmental Protection Agency

Prepared by

Texas Natural Resource Conservation Commission
Site Assessment Management Section
Site Discovery and Assessment Program
Site Investigation Manager - Johnny W. Kennedy
Austin, Texas

January 2001

The preparation of this report was financed through grants from the U.S. Environmental Protection Agency administered through the Texas Natural Resource Conservation Commission.

CONTENTS

FIGURES

TABLES

NOTE

The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

SECTION 1

INTRODUCTION

The Texas Natural Resource Conservation Commission (TNRCC) has been tasked by the U.S. Environmental Protection Agency (EPA) Region VI to conduct an Expanded Site Inspection (ESI) at the Gulfco Marine Maintenance, Incorporated (Gulfco) site (EPA Identification No. TXD055144539). The site is located at 906 Marlin Avenue (County Road 756), Freeport, Brazoria County, Texas (Figure 1). It consists of lots 21 through 25 of the Bridge Harbor Division on the south side of Marlin Avenue (main facility) and lots 55 through 58 of the Bridge Harbor Division on the north side of Marlin Avenue. Lots 21 through 25 are approximately four acre tracts bordered on the south by the Intercoastal Waterway. Lots 55 through 58 are approximately five acre tracts. The entire site is approximately 40 acres in size.(Ref. 5, p. 1-1).

Gulfco operated a barge cleaning and waste disposal facility in Freeport, Texas from 1971 through 1979. Barges brought to the site were cleaned of waste oils, caustics, and organic chemicals, and the wash waters generated during these operations were reportedly stored in three surface impoundments located on Lot 56 on the north side of Marlin Avenue (Figure 2) (Ref. 6, p. 5). These surface impoundments are described in a July 15, 1980 USEPA Site Inspection Report as lined, earthen lagoons (Ref. 7, p.6).

Fish Engineering and Construction, Incorporated (Fish Engineering) purchased the site in November 1979 from Gulfco Marine Maintenance, Incorporated. Fish Engineering also utilized the site for barge servicing and cleaning. In 1981, Fish Engineering deactivated the on-site surface impoundments and began closure activities. These impoundments were reportedly closed, covered with a hard wearing surface, and certified as closed in August 1982 (Ref. 8, p. 1). Four monitor wells screened between 38 to 48 feet were installed during closure of the impoundments and sampled at least four times from July 1982 through September 1982. The analyses performed were benzene, phenols, chlorides, conductivity, pH levels and TOC. Total organic halogens (TOX) could not be determined due to high interference with high inorganic chlorides. The analysis revealed concentrations of benzene (1 to 8180 ppb), inorganic chlorides (higher than 15, 700 ppb), phenols (<10 to 1092 ppb), and TOC (60 to 290 ppb) (Ref. 6, p. 4). These wells were reportedly plugged in December 1983 (Ref. 8, p. 9).

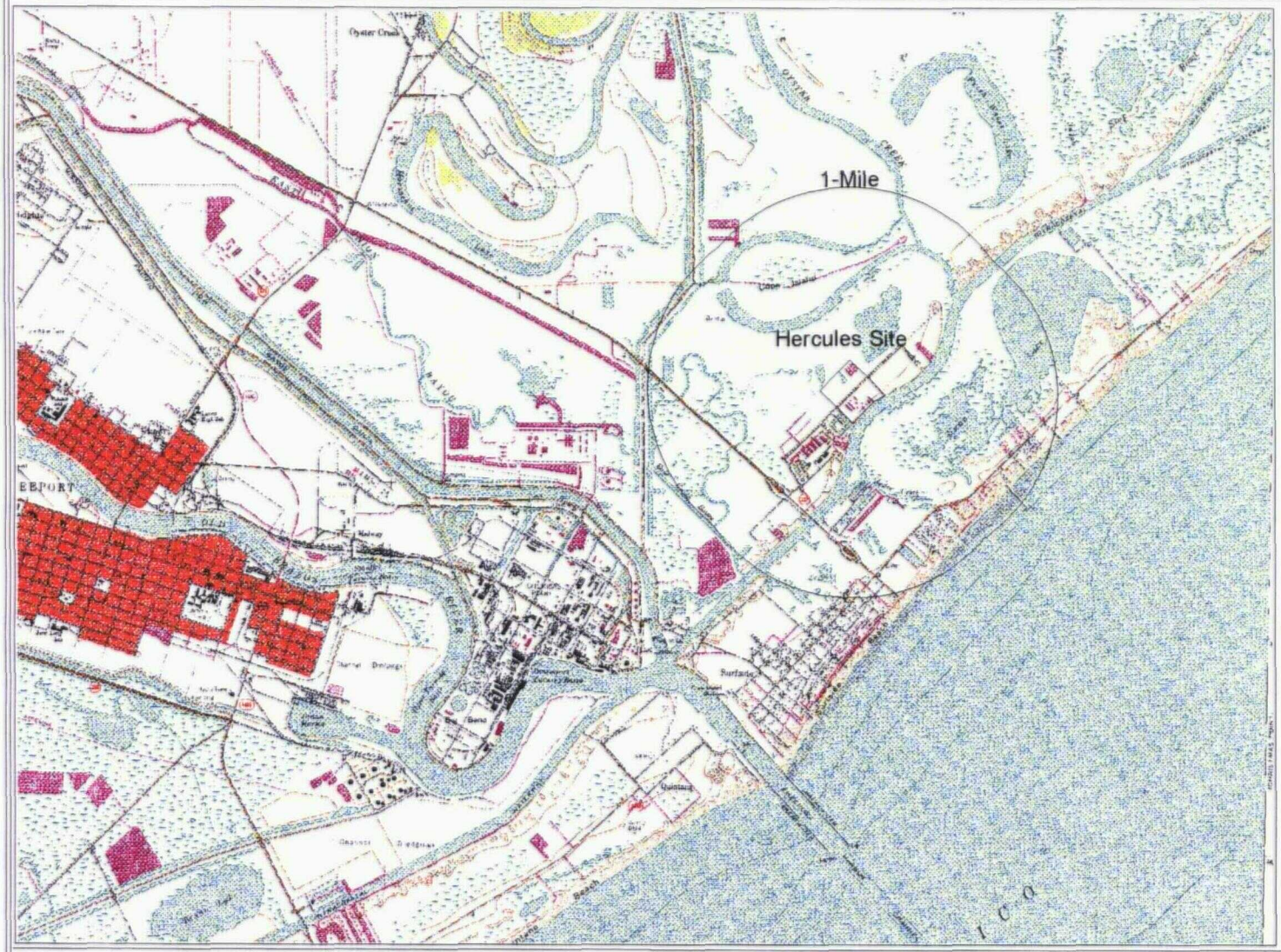
On January 20, 1989, Fish Engineering sold the majority of the Gulfco site to Hercules Offshore Corporation (Hercules), with the exception of Lot 56 (on the north side of Marlin Avenue). Lot 56 is the location at which Gulfco operated three (3) surface impoundments (Ref. 8, p. 1). Hercules installed three monitor wells near the previous surface impoundments in January 1989 prior to their purchase of the site from Fish (Ref. 9). Analysis of ground water samples from these three wells indicated detectable concentrations of volatile organic compounds and pesticides. Soil samples collected during the construction of the monitor wells indicated elevated levels heavy metals

(Ref. 10. The status of these wells is unknown. Hercules conducted barge cleaning and refurbishing operations at the site until May 1998, when the company declared bankruptcy (Ref. 11, p. 2).

Three additional monitor wells are located on the southern part of the site south of Marlin Avenue. No information is available concerning construction of these wells or when they were installed, however, total depths for the wells range from about 15.2 feet to 20.3 feet (Ref. 5, pp. 55 - 57; Ref. 12, pp. 71 & 72). LT Environmental, Inc. (LTE) sampled these wells on March 18, 1999 and analyzed the ground water samples for VOCs. The sample results indicated no VOCs were detected. These monitor wells were sampled during the January 2000 SSI sampling event, with eleven inorganic contaminants being detected as an observed release.

The original Gulfco site is currently owned by two entities. LDL Coastal, Inc. purchased Lots 21 through 25 on the south side of Marlin Avenue and Lots 55, 57 and 58 on the north side of Marlin Avenue through the Chapter 7 bankruptcy court in mid-1999. This is the portion of the site previously owned and operated by Hercules (Ref. 13, p. 1). KTI Fish (KTI purchased Fish Engineering forming KTI Fish) sold Lot 56 of the original Gulfco site to Messrs. Jack Palmer and Ron Hudson sometime in 1999 (Ref. 14). The geographic coordinates for the site are Latitude 28° 58' 07" North and Longitude 95° 17' 26" West (Ref. 13, p. 1) (Figure 1).

The sampling conducted during the January 2000 SSI sampling event was not adequate to address the former surface impoundments as a source area for the site or to evaluate the potential impact of a release of contaminants to the shallow ground water related to the former surface impoundments. Based upon a review of available data, the ground water pathway is the pathway of concern for this investigation of the Gulfco site. A discussion of this pathway is summarized in the following sections. The purpose of this work plan is to describe the site reconnaissance and sampling activities which are planned at the Gulfco site and surrounding area. Data collected during this ESI will be used to determine whether further actions are required at the site.



TNRCC

Protecting Texas by Reducing and Preventing Pollution

Gulfco Marine Maintenance, Inc.
TXD # 055144539

N

1 0 1 2 Miles

Legend

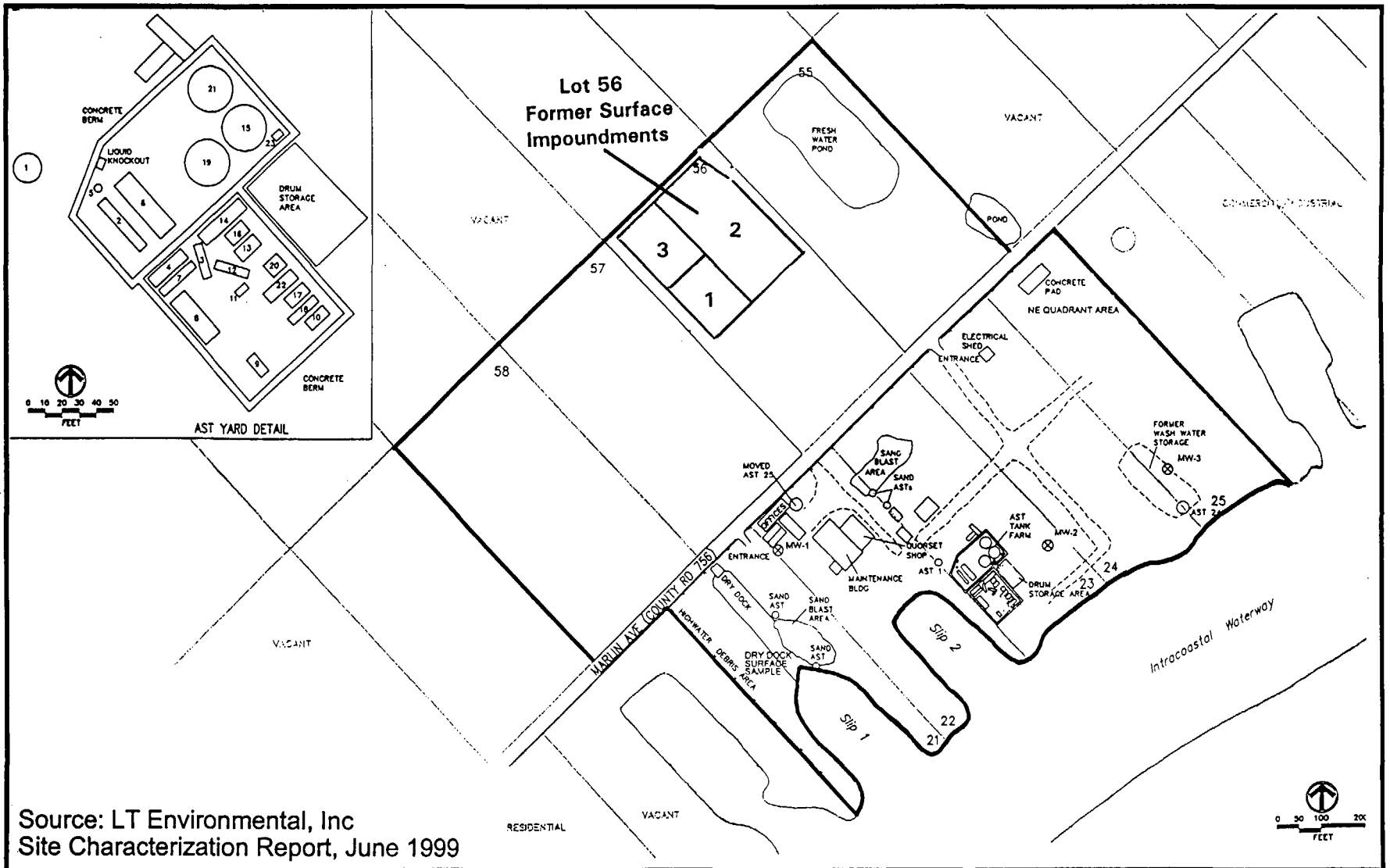
Distance from site

Source (for DOQQ)

The base data used is the Freeport, Texas Digital Raster Graphic (DRG), which is a scanned image of a U.S. Geological Survey topographic map.
UTM NAD 27 Zone # 15

Figure # 1
Page # 3

003147



Source: LT Environmental, Inc
Site Characterization Report, June 1999

TNRCC

Figure 2

Site Features Map

Gulfco Site
Freeport, Brazoria County, Texas
EPA ID. No. TXD055144539

WORK PLAN OVERVIEW

The purpose of this investigation is to document the release(s) or potential release(s) of hazardous substances from identifiable sources to the shallow ground water of the Chicot/Evangeline aquifer beneath the site. This work plan was developed using available information obtained primarily through a review of TNRCC Central Office files located in Austin, Texas, TNRCC Region 12 files located in Houston, Texas, a June 1999 Site Characterization Report for the Hercules Marine Service Site prepared by LTE, and a July 2000 Screening Site Inspection (SSI) report for the Gulfco Marine Maintenance site. The information collected from these sources was evaluated for data gaps and additional information needs were incorporated into the work plan. This plan will be modified as necessary based on actual site conditions encountered.

Section 1 is the Introduction and Section 2 describes the field work to be conducted. Well data for wells completed at the Gulfco site, the Gulfco Site Health and Safety Plan, the TNRCC FY2000-2001 Quality Assurance Project Plan (QAPP) document, and the Site Reconnaissance Checklist are presented as appendices A through D, respectively.

SITE OBJECTIVE WITH RESPECT TO THE PREREMEDIAL PROCESS

The preremedial stage of the Superfund process involves a Preliminary Assessment (PA) stage and a Site Inspection (SI) stage consisting of a Screening Site Inspection (SSI) and, if necessary, a Listing Site Inspection (LSI). This ESI is being conducted to determine if the Gulfco site is eligible for proposal to the National Priorities List (NPL) under the Federal Superfund Program. The ESI will concentrate on assessing the threat along the ground water pathway within and adjacent to the site.

Separate SSI reports have been completed for both the Fish Engineering and Construction and the Hercules Offshore Corporation parts of the original Gulfco site (Ref. Ref. 8; Ref. 13). On October 26, 1998, TNRCC Region 12 staff performed a site inspection at the Hercules site for the purpose of documenting current site conditions including potential waste source areas requiring further investigation (Ref. 15). LTE prepared a Site Characterization Report for LDL Coastal in June 1999 prior to LDL Coastal's purchase of the former Hercules site from the Chapter 7 bankruptcy court (Ref. 11). The TNRCC conducted an SSI field sampling event at the Gulfco site from January 24 through January 27, 2000 (Ref. 12). Data collected during the SSI investigation are presented in a July 2000 SSI report. This ESI will build upon existing data by collecting additional ground water samples to further characterize conditions related to the former surface impoundments operated at the site. Environmental sampling during this ESI will attempt to document the release and/or potential to release of hazardous substances to the shallow ground water of the Chicot/Evangeline aquifer beneath and determine whether the potential release(s) has migrated off-site.

PROJECT CONTACTS

EPA:

Bill Rhotenberry
Environmental Protection Specialist
U.S. Environmental Protection Agency, Region VI
Superfund Site Assessment Section
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733
(214) 665-8372

TNRCC:

Wesley G. Newberry, Technical Director
(512) 239-2512
Allan M. Seils, PA/SI Program Manager
(512) 239-2514
John C. Syer, Health and Safety Officer
(512) 239-4136
Stephanie Pogue, Quality Assurance Officer
(512) 239-5633

Texas Natural Resource Conservation Commission
Remediation Division
Site Assessment Management Section
P.O. Box 13087, MC 142, Capitol Station
Austin, Texas 78711
(512) 239-2514

Johnny W. Kennedy, Geologist, Site Investigation Manager
Remediation Division, Region 12 Office
5425 Polk, Suite H
Houston, Texas 77023-1423
(713) 767-3552

SITE CONTACTS

Hercules Site

LDL Coastal, Inc.
c/o Allan Daniels
1177 West Loop South, Ste. 1725
Houston, Texas 77027
(713) 626-0215

Lot 56

Jack Palmer & Ron Hudson
1509 Alta Vista Drive
Alvin, Texas 77511
(281) 388-1959

SECTION 2

SITE NONSAMPLING DATA COLLECTION AND FIELD WORK

The Texas Natural Resource Conservation Commission (TNRCC) will perform the activities described in this section to provide site background information and analytical data that can be used by the EPA to evaluate the Gulfco site using the Hazard Ranking System (HRS). This information will be presented in a documentation report that includes ground water sampling as discussed below.

All field work will be conducted in accordance with the Gulfco Site Health and Safety Plan (HSP) and the TNRCC-approved quality assurance project plan (QAPP). The HSP and QAPP are in appendices B and C, respectively. These plans will be reviewed by all personnel upon arrival at the site.

PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

The TNRCC Central Office Technical Director for this Expanded Site Inspection (ESI) is Mr. Wesley Newberry and the TNRCC Program Manager is Mr. Allan Seils. The TNRCC Site Investigation Manager is Mr. Johnny W. Kennedy, Region 12 Office, Houston, Texas. Other team members will be identified prior to the sampling event. The TNRCC's Central Office mailing address is the Remediation Division, Site Assessment Management Section (SAMS)/MC 142, P.O. Box 13087, Austin, Texas 78711-3087, [Telephone No. (512) 239-2514, FAX No. (512) 239-4814]. The TNRCC Region 12 Office mailing address is 5425 Polk, Suite H, Houston, Texas 77023-1423, [Telephone No. (713) 767-3500, FAX No. (713) 767-3561].

The TNRCC Central Office Program Manager and Site Investigation Manager are responsible for identifying, assigning and organizing the staff to execute the activities required to complete the ESI. The Site Investigation Manager is responsible for completing the activities described in this plan and adhering to the sampling activities and report schedule. The planned field schedule for activities at the Gulfco site is listed in Table 1.

The TNRCC Technical Director and Program Manager will review all major reports and provide technical and administrative support to the Site Investigation Manager. The TNRCC Technical Director will review the work plan and final report and will approve the final versions. In addition, the TNRCC Technical Director and Program Manager will provide oversight for the field activities during the investigation. The EPA Region VI site assessment manager (SAM) is responsible for approving the sampling activity's work plan and reviewing the final report.

Table 1 - Gulfco Marine Maintenance, Incorporated Site Field Schedule

Time	Activity
	Day 1
1000	Austin team members travel from Austin to Freeport. Region 12 personnel will meet at the site with the State's contractor to discuss the proposed sampling plan and locations.
1500	Region 12 staff will meet Austin team members at site. Review the health and safety plan and conduct safety briefing. Conduct an off-site reconnaissance. Prepare shipping labels, sample tags, and the field logbooks.
1800	End of day.
	Day 2
0700	Arrive at the site. Review the health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare sampling equipment. Conduct equipment decontamination and collect an initial equipment rinsate sample.
0800	Begin the collection of ground water samples around the former surface impoundments using a direct-push sampling probe. Purge on-site monitor wells. All applicable sampling data will be recorded in the field logbook and sample locations will be documented with photographs and applicable GPS data.
1200	Lunch break.
1300	Continue the collection of ground water samples using the direct-push sampling probe. Check recharge of aquifer in on-site monitor wells, and begin collection of monitor well samples assuming recharge is sufficient. Collect a field blank.
1600	Begin packaging samples and completing CLP lab documentation. Conduct a decontamination event of all non-dedicated sampling equipment (as required) and collect a rinsate sample. Schedule shipment of collected ground water samples for the following day with Airborne Express office.
1800	End of day.
	Day 3
0700	Arrive at the site. Review the health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare sampling equipment.
0800	Begin the collection of ground water samples using the direct push sampling probe. Collect monitor well ground water samples (if required). All applicable sampling data will be recorded in the field logbook and sample locations will be documented with photographs and applicable GPS data.
1200	Lunch break.
1300	Continue the collection of ground water samples using the direct-push sampling probe. Collect field blank sample.
1600	Complete sample collection for the day. Package and prepare samples for shipment. Prepare CLP lab documentation. Conduct a decontamination event of all non-dedicated sampling equipment (as required) and collect a rinsate sample.
1800	End of day.

Table 1 (Continued) - Gulfco Marine Maintenance, Incorporated Site Field Schedule

Time	Activity
	Day 4
0700	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare sampling equipment.
0800	Begin the collection of ground water samples using the direct-push sampling probe (if required). Collect field blank sample. All applicable sampling data will be recorded in the field logbook and sample locations will be documented with photographs and applicable GPS data.
1200	Lunch break.
1300	Complete sample collection. Package and prepare samples for shipment. Prepare CLP lab documentation. Conduct a decontamination event of all non-dedicated sampling equipment, and collect a final rinsate sample.
1600	Depart site. Austin field team members return to Central Office and Region 12 personnel will deliver samples for shipment and return to Regional Office.

COMMUNITY RELATIONS

Prior to the start of any work at the Gulfco site, TNRCC will inform the appropriate city and/or county authorities of the sampling event. Individual residents in the immediate area where samples will be collected will be contacted by letter from the TNRCC or during the initial off-site reconnaissance visit. Requests for information will be made during the interview process or identified in the letter from the TNRCC. The TNRCC will make no other formal notifications of the ESI sampling events. Sample results will be sent to each property owner, for their property only, upon completion of the data quality assurance process. Any requests for information before or after the planned Expanded Site Inspection which the TNRCC receives from the above will be referred through the PA/SI Program Manager for an appropriate response. Any requests for information by the news media or parties not associated with Gulfco site will be directed through the TNRCC Technical Director or his designee to the TNRCC Central Office Media Relations Office, P.O. Box 13087, Austin, TX 78711, telephone (512) 239-5000.

The TNRCC Program Manager will provide each member of the TNRCC inspection team and the Site Investigation Manager with letters of introduction stating the purpose of the investigation and authorization to conduct appropriate field activities. The TNRCC will send notification letters to the appropriate property owners informing them of the impending sampling activities and requesting access authorization for TNRCC inspectors. The TNRCC will make arrangements for the property visit only after receiving written or verbal access authorization from the property owner or their representatives.

WORK PLAN ACTIVITIES

Task 1: Nonsampling and Sampling Activities and Rationale

The field team will first meet with property owner representatives (if specifically requested) and appropriate City authorities at a suitable nearby public facility or at the site staging area. The purpose of the meeting will be to conduct an initial safety briefing and review the intended sampling work schedule. Information concerning past and current site conditions documented in the ESI work plan will be discussed and verified. The Site Investigation Manager will record significant comments in the field logbook pertaining to the site and property history, and current/past operations.

After the initial meeting, an off-site reconnaissance inspection will be completed by designated team members. Information will be logged in the field logbook to include names of individuals interviewed, physical/mailing addresses, date and time of interviews and observations noted. Information outlined in the Site Reconnaissance Checklist **(Appendix D)** applicable to off-site requirements will be obtained during the inspection. The off-site reconnaissance will be conducted at level D (Modified) protection.

During the initial reconnaissance inspection of the Gulfco site, the sampling team may be accompanied by the current property caretaker or his designated representative, if available, to assist in identifying potential hazards. Personnel protective equipment will initially be modified level D as specified in the Health and Safety Plan (Appendix B).

Each waste management unit will initially be approached to detect and identify any physical hazards that may be present and to identify evidence of contaminant migration. Any visual evidence of a release of hazardous substances will be noted to ascertain whether additional protective equipment will be required for the sampling events. In general, personnel safety requirements will be identified and assessed during the initial site reconnaissance inspection. In addition, safe entry and exit points will be identified for each proposed sampling event.

Upon completion of the site reconnaissance activities, the field team will again review the sampling plan. Sample locations will be adjusted as necessary to ensure that the samples provide sufficient data to properly evaluate the site. Photographs will be taken as required to document site and property conditions and support observations recorded in the field logbook. Photographs will require at a minimum, the following information for each photograph:

- Site name
- Location
- Name of photographer
- Date and time of photograph
- Description of situation/scene photographed.
- Type of camera, film, and lens setting (Must be 50mm).

The following section describes the proposed sampling plan for the Gulfco site. This plan may be modified as a result of the on-site reconnaissance and/or noted property access constraints. The samples to be collected and sample rationale are listed in Table 2. Proposed sample analyses, containers, and preservation requirements for the ground water samples are shown in Table 3. Sample locations will be confirmed during the site reconnaissance inspection and noted in the field logbook. A field copy of this work plan will be annotated by the Site Investigation Manager to reflect actual sample locations.

Table 2 - Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Ground Water	GW-01	Ground water sample from the north side of the former surface impoundments	Assess potential ground water contamination related to a release from the former surface impoundments.
	GW-02	Ground water sample from the east side of the former surface impoundments	Assess potential ground water contamination related to a release from the former surface impoundments
	GW-03	Ground water sample from the west side of the former surface impoundments	Assess potential ground water contamination related to a release from the former surface impoundments
	GW-04	Ground water sample from the south side of the former surface impoundments	Assess potential ground water contamination related to a release from the former surface impoundments
	GW-05	Quality Assurance/Quality Control (QA/QC)	Duplicate ground water sample from same location as ground water sample GW-04
	GW-06	Ground water sample from off-site location east of the large fresh water pond	Assess whether potential ground water contamination has migrated off-site to the east
	GW-07	Ground water sample from off-site location north of the former surface impoundments	Assess whether potential ground water contamination has migrated off-site to the north
	GW-08	Ground water sample from area south of Marlin Avenue, directly south of the former surface impoundments	Assess whether potential ground water contamination has migrated south of Marlin Avenue
	GW-09	Ground water sample from area south of Marlin Avenue, on the east side of the site	Assess whether potential ground water contamination has migrated south of Marlin Avenue
	GW-10	Ground water sample from off-site location west or north-west of the Gulfco site	Establish background levels of contaminants in shallow aquifer
	GW-11	Ground water sample from off-site location east of the Gulfco Site	Establish background levels of contaminants in shallow aquifer

Table 2 (Continued) - Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Ground Water (Continued)	GW-12	Ground water sample from monitor well #1 at the Gulfco site	Assess whether potential ground water contamination from the former surface impoundments has migrated across southern part of the Gulfco site
	GW-13	Ground Water Sample from monitor well #2 at the Gulfco site	Assess whether potential ground water contamination from the former surface impoundments has migrated across southern part of the Gulfco site - *Triple Volume Sample*
	GW-14	Ground water sample from monitor well #3 at the Gulfco site	Assess whether potential ground water contamination from the former surface impoundments has migrated across southern part of the Gulfco site
	GW-15	Quality Assurance/Quality Control (QA/QC)	Duplicate ground water sample from same location as ground water sample GW-12.
QA/QC	GW-16	QA/QC	Equipment rinsate from non-dedicated sampling equipment prior to commencement of sampling activities
	GW-17	QA/QC	Equipment rinsate from non-dedicated sampling equipment after day 1 sampling activities
	GW-18	QA/QC	Equipment rinsate from non-dedicated sampling equipment after day 2 sampling activities
	GW-19	QA/QC	Equipment rinsate from non-dedicated sampling equipment after day 3 sampling activities
	GW-20	not applicable	Field blank for ground water matrix (QA/QC)- *Full suite analysis*
	GW-21	not applicable	Field blank for ground water matrix (QA/QC) - *Full suite analysis*
	GW-22	not applicable	Field blank for ground water matrix (QA/QC) - *Full suite analysis*

Table 3 - Sample Containers, Methods, Preservatives, and Holding Times for Aqueous Samples

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 40-ml wide mouth glass vials with Teflon-lined septa	Cool to 4°C	7 days
Semivolatile organics	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Pesticides/PCBs	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Metals/Cyanide	Two 1-liter polyethylene bottles with Teflon-lined caps	HNO_3 to pH < 2 /NaOH to pH > 12 Cool to 4°C	6 months (except mercury*) and 14 days for cyanide

* Reference: EPA Contract Laboratory Program Statement of Work for Organics Analysis (March 1990) and Statement of Work for Inorganic Analysis (March 1990).

Waste Containment/Hazardous Substance Identification

This ESI is being conducted for the limited purpose of evaluating the on-site and off-site potential release of contaminants to the ground water pathway related to the former surface impoundments operated at the Gulfco site. These former surface impoundments were located on Lot 56 of the original site (Figure 2).

Non-sampling data to be collected include:

- Visually verify the extent of the former surface impoundments on Lot 56.
- Document existing site conditions including current site operations, site security, and any new areas of environmental concern.
- Collect ground water samples adjacent to the former surface impoundments to document whether a release of hazardous substances has occurred to the shallow ground water and/or whether potential contamination has migrated along the ground water migration pathway.
- Obtain, as a minimum, two background ground water samples to determine the naturally occurring levels of the contaminants of concern in the shallow aquifer from unaffected areas up-gradient from the site.

Gulfco Marine Maintenance, Incorporated began operating three, earthen surface impoundments in 1971 to store wash waters generated during the cleaning of barges and other vessels transporting waste oils, caustics, and organic chemicals (Ref. 6, p. 2) (Figure 2). The three surface impoundments were apparently lined with a natural site clay layer, and were interconnected by overflow pipes. The approximate dimensions of the impoundments were as follows: Impoundment 1 (southeast) was 156 feet long by 96 feet wide, Impoundment 2 (west) was the largest impoundment with approximate dimensions of 330 feet long by 197 feet wide, and Impoundment 3 (northeast) was 145 feet long by 96 feet wide. Depths of the impoundments are listed as being unknown. The maximum inventory of waste stored in the surface impoundments at any give time was 5.5 million gallons (Ref. 6, pp. 4 and 5).

Fish Engineering purchased the site on November 12, 1979 from Gulfco Marine Maintenance, Incorporated (Ref. 11. pp. 1 - 3). Fish Engineering continued to utilize the three surface impoundments for the storage of waste wash waters generated during barge cleaning operations until the surface impoundments were deactivated on October 16, 1981. Subsequent operations utilized floating barges and aboveground storage tanks to store the generated wash waters. The Texas Department of Water Resources (TDWR) approved a modified closure plan for the surface impoundments on May 21, 1982, with the provision that the surface impoundments were covered with three feet of a clay-rich cover and a foot of topsoil seeded with a self-sustaining vegetative cover (Ref. 17). On June 21, 1982, the TDWR approved a modification to

the closure of the surface impoundments whereby a hard wearing surface could be substituted for the topsoil and vegetative cover (Ref. 18).

Environmental samples were collected during the closure activities from the soils, sludges, and from the water in the surface impoundments and analyzed for total volatile matter, oil and grease, phenols, and benzene. The sample results indicated that the total volatile matter ranged from 2.2 percent to 5.47 percent; the oil and grease ranged from 0.65 percent to 34.89 percent; the levels of phenol ranged from 0.05 ppm to 5.6 ppm; and the levels of benzene ranged from 0.05 ppm to 11.6 ppm (Ref. 19, pp. 6 - 10). A consultant for Fish Engineering also attempted to estimate the organic halogens in some of the samples, but the results were not satisfactory in that the least contaminated sample contained the highest level of organic halogen. The TDWR permit staff classified the waste in the ponds as Class II, but requested that Fish Engineering conduct a ground water monitoring program (Ref. 20, p. 6).

Fish Engineering also installed four monitor wells screened between 38 to 48 feet around the surface impoundments during closure activities. These monitor wells were sampled at least four times between July 1982 and September 1982, and the samples were analyzed for benzene, phenols, chlorides, conductivity, pH, and TOC. Total organic halogens (TOX) could not be determined due to the interference with the high inorganic chlorides in the ground water. The analysis revealed concentrations of benzene (1 to 8180 ppb), inorgainc chlorides (higher than 15,700 ppb), phenols (< 10 to 1092 ppb), and TOC (60 to 290 ppb) (Ref. 6, p. 4). These wells were reportedly plugged in December 1983 (Ref. 8, p. 9).

Closure of the surface impoundments reportedly involved removal of the contained liquids, removal of the majority of the sludges, solidifying the remaining sludge with soil, and capping the surface impoundments with a three foot clay cover. A hard wearing surface was then installed above the clay cover. The surface impoundments were certified closed by Clair A. Carden, P. E., pursuant to an August 18, 1982 letter to Mr. Glen J. Gill, Senior Vice-President of Fish Engineering (Ref. 21).

Hercules installed three, eighteen (18) foot monitor wells near the former surface impoundments in January 1989 prior to their purchase of the site from Fish Engineering (Ref. 22, pp. 2 - 5). Analysis of the ground water samples from these three wells indicated detectable concentrations of volatile organic compounds and pesticides. Soil samples collected during the construction of these monitor wells indicated elevated levels of heavy metals (Ref. 23, pp. 14 & 19). These wells were observed during a November 28 and 29, 1989 SSI site reconnaissance inspection for the Hercules site (Ref. 8, p. 7), however, no mention of these wells was recorded in either a Site Characterization Report for the Hercules site (Ref. 5), or in an October 26, 1998 TNRCC Region 12 report (Ref. 15). These wells were not observed during the January 2000 SSI sampling event.

LTE installed two, 8 foot temporary monitor wells on the west side of Lot 55 during a 1999 site characterization investigation. These wells were located between the

former surface impoundments and the large fresh water pond. Ground water samples collected from the wells were submitted only for VOC analysis, with the results indicating no VOCs detected (Ref. 5, pp. 16 & 38).

During the January 2000 SSI sampling event, two soil samples were collected from Lot 56 south of the former surface impoundments. Chemical analysis of these samples indicated no organic contamination, however, inorganic contaminants were detected above the background concentrations and above the sample quantitation limit. Ground water samples collected from the three monitor wells on the southern part of the site during the SSI sampling indicated an observed release of 9 inorganic contaminants which were also detected in the soil samples on Lot 56.

Hazardous substances were detected in soil and sludge samples collected from the former surface impoundments during closure activities in 1982. Reportedly, some of these sludges in the surface impoundments were left in place following closure (Ref. 8, p. 6). Limited analysis of ground water samples collected from monitor wells in 1982 by Fish Engineering (Refs. 24 - 27) , ground water samples collected from three different monitor wells in 1989 by Hercules (Refs. 22 & 23), and ground water samples collected during the January 2000 SSI sampling event indicate hazardous substances had been released to the shallow ground water beneath the site. However, no contaminants were detected in the ground water samples collected from temporary monitor wells installed by LTE in 1999. These wells, however, were only completed to a depth of 8 feet (Ref. 5, pp. 16, 38, 46, 47).

The sampling conducted during the January 2000 SSI sampling event was not adequate for the collection of samples of the potential waste material left in the former surface impoundments following closure activities, nor did the SSI sampling methods allow for the collection of ground water samples from the shallow aquifer beneath the former surface impoundments. During this ESI sampling event, ground water samples will be collected using a direct-push sampling probe to evaluate this potential threat.

On-site ground water samples will be collected to determine whether there has been a release of hazardous substances to the shallow ground water attributable to the former surface impoundments. Off-site ground water samples will be collected to determine the naturally occurring levels of contaminants in the aquifer and to determine whether a potential release of site contaminants has migrated off-site. All ground water samples will be analyzed for inorganics (metals), organics (volatiles, semi-volatiles, PCBs and pesticides) and cyanide.

To obtain legally defensible site characterization data, a laboratory will be designated to perform EPA-stipulated Contract Laboratory Program (CLP) analytical methods on all samples collected from the Gulfco Site. The specific analytical methods for this sampling event are those listed under the CLP routine analytical services (RAS) contract.

Ground Water Pathway

There is no documentation indicating that drinking water wells in the vicinity of the site have been contaminated by hazardous substances from the site (Ref. 12). The only drinking water wells identified within a 1-mile radius of the Gulfco site belong to the Village of Surfside Beach. These four wells are located at two locations (two wells at each location) south and southeast of the site across the Intercoastal Waterway. Two of these wells (one from each location) were sampled during the January 2000 SSI sampling event. Laboratory analysis indicated that there were no organic or inorganic contaminants detected as an observed release in these target drinking water wells. Three additional public drinking water wells between 1 and 2 ½ miles from the site were also sampled during the ESI sampling event. No observed releases were documented from any of these drinking water wells.

Previous investigations at the Gulfco site have documented contamination of the shallow transmissive zone of the Chicot aquifer beneath the site. Four (4) monitor wells screened between 38 to 48 feet were installed around the former surface impoundments on Lot 56 during closure activities (Ref. 12, p. 9). These wells were sample at least four times from July 1982 through September 1982. The analyses performed were benzene, phenols, chlorides, conductivity, pH levels and TOC. Total organic halogens (TOX) could not be determined due to high interference with high inorganic chlorides. The analysis revealed concentrations of benzene (1 to 8180 ppb), inorganic chlorides (higher than 15, 700 ppb), phenols (<10 to 1092 ppb), and TOC (60 to 290 ppb). These wells were reportedly plugged in December 1983.

In January 1989, Hercules installed three, eighteen (18) foot monitor wells near the previous surface impoundments when it was evaluating the purchase of the Gulfco site (Ref. ??, pp. 2 - 5). Analysis of ground water samples from these three wells indicated detectable concentrations of volatile organic compounds and pesticides. Soil samples collected during the construction of the monitor wells indicated elevated levels heavy metals (Ref. ??, pp. 2 - 27).

Three monitor wells are located at the main facility part of the site south of Marlin Avenue (Figure 2). No information is available as to the construction of these wells or when they were installed, however, total depths for the wells range from about from 15.2 to 20.3 feet (Ref. ??, pp. 55 - 57; Ref. ??, pp. 71 and 72). LTE sampled these wells on March 18, 1999 and analyzed these samples for VOCs. The sample results indicated no VOCs were detected (Ref. 5, p. ??). These three monitor wells were also sampled during the January 2000 SSI sampling event at the Gulfco site. The sample analyzes indicated observed releases of ten inorganic contaminants

The ground water pathway from the Gulfco Site will be evaluated by collecting ground water samples from the Chicot aquifer using a direct-push sampling probe and existing monitor wells at the site. Potential contaminant pathways include seepage and infiltration from the former surface impoundments located on Lot 56 and lateral migration of contaminants away from the waste source area in the shallow aquifer.

For the purposes of this ESI, a total of fifteen (15) ground water (GW) samples including two (2) duplicate samples will be collected for CLP analysis using a direct-push sampling probe and from existing monitor wells. These samples will be used to verify whether a release of on-site contaminants from the former surface impoundments has impacted the shallow aquifer beneath the site and whether a potential impact to the aquifer has migrated away from the source area along the ground water migration pathway. Ground water sample identification, well description, location and sampling rationale are provided in Table 2. The proposed ground water sample locations are shown in Figure 3.

A total of four (4) ground water samples (GW-01 through GW-04) will be collected using a direct-push sampling probe around the former surface impoundment. Ground water sample GW-01 will be collected from the north side of the surface impoundment; ground water sample GW-02 will be collected from the east site of the former surface impoundments; ground water sample GW-03 will be collected from the west side of the former surface impoundments; and ground water sample GW-04 will be collected from the south side of the former surface impoundments. A duplicate sample (GW-05) will be collected from the same location as ground water sample GW-04 to fulfill the quality assurance/quality control requirements.

Two ground water samples, GW-06 and GW-07, will be collected to access whether potential contaminants related to the former surface impoundments have migrated off-site. Ground water sample GW-06 will be collected east of the large fresh water pond and ground water sample GW-07 will be collected north of the former surface impoundments.

Ground water samples will also be collected from the main part of the facility to determine whether potential contamination related to the former surface impoundments has migrated south of Marlin Avenue. Ground water sample GW-08 will be collected from an area south of Marlin Avenue, directly south of the former surface impoundments. Ground water sample GW-09 will be collected from an area south of Marlin Avenue, southeast of the former surface impoundments. In addition, the three monitor wells located on the main part of the facility will be sampled. Ground water sample GW-12 will be collected from monitor well #1, ground water sample GW-13 will be collected from monitor well #2, and ground water sample GW-14 will be collected from monitor well #3. A duplicate ground water sample (GW-15) will be collected from the same location as ground water sample GW-12 to fulfill the quality assurance/quality control requirements.

Two background ground water samples will be collected during the ESI sampling event to establish naturally occurring levels of contaminants in the shallow transmissive zone of the Chicot aquifer. Ground water sample GW-10 will be collected from an off-site location to the west or northwest of the site, and ground water sample GW-11will be collected from an off-site location to the east of the site. The exact location of the background sample locations will be determined in the field pending the identification of suitable sample locations and property access.

Ground water samples to be collected during this sampling event will be obtained by two different methods. Ten (10) ground water samples and one (1) duplicate ground water sample will be collected using a vehicularly-mounted, direct-push sampling probe. The remaining ground water samples will be collected from the three on-site monitor wells at the main part of the site south of Marlin Avenue.

Well purging and sampling procedures are dependent on the type of well and are discussed in more detail in the QAPP (Appendix D). As a general rule, all monitoring wells will be purged a minimum of three volumes of water in the well casing with three (3) consecutive consistent readings within 10% RPD for conductivity, ± 1° C for temperature, and within ± 0.5 pH units before the representative samples are withdrawn. Wells should be allowed to recover at least 85% of the original water volume prior to the collection of the samples. Field log notes will reflect the well evacuation procedure used during the sampling event.

Each monitor well will be purged using a dedicated Teflon bailer. If non-dedicated equipment is utilized for purging of the wells, this equipment will be decontaminated prior to and following each use as specified in the QAPP (Appendix D).

Ground water samples collected using the direct-push sampling probe may be obtained by several different methods. The preferred method will be to use dedicated tubing and a peristaltic pump. However, should it be necessary, a small stainless-steel bailer may be used depending upon site conditions and/or the equipment available from the State's contractor. Should non-dedicated sampling equipment be used, proper decontamination procedures will be followed as specified in the QAPP.

Purge waters will be managed according to guidance provided in the "Management of Investigation-Derived Waste During Site Inspections", May 1991. The preference is to leave both RCRA hazardous and non-hazardous investigation-derived wastes on-site whenever it complies with regulations and does not pose any immediate threat to human health and the environment.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Appropriate equipment and personnel decontamination procedures are described in the attached QAPP. Proper sample containers, preservation and holding times are presented in Table 3 for CLP aqueous samples.

TNRCC

Protecting Texas by Reducing and Preventing Pollution

Gulfco Marine Maintenance, Inc.
TXD # 055144539

N

0.2 0 0.2 0.4 Miles

Legend

GW-01 ⊙ **Ground Water Sample Location**

Source (for DOQQ)

The base data used is the Freeport Digital Orthoquarter Quad (DOQQ), which is a digital version of an aerial photograph. This DOQQ was produced by the TNRCC using USGS guidelines. UTM NAD83 Zone # 15

Figure # 3
Page # 21

003165

Quality Assurance/Quality Control Samples

Four types of QA/QC samples will be used in this sampling inspection. Duplicate samples will be taken at the rate of one (1) duplicate per matrix (ground water) and one (1) duplicate for every ten (10) samples collected. Field blanks will be collected and accompany each ice chest containing ground water samples shipped for volatile organic analysis. Equipment rinsate samples will be collected to establish that proper field decontamination procedures have been employed for sampling equipment which is used more than once in the field. In addition, temperature blanks will accompany each ice chest to the respective laboratories.

The field blank samples for the Gulfco ESI will be submitted for a full-suite analysis (i.e. volatile organics, extractable organics, total metals, and cyanide) and will serve two field quality control requirements. Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA field blank will be analyzed to monitor for possible sample contamination and to detect contaminants in the sample bottles. Each VOA field blank will be prepared by filling two VOA vials with CLP-specified grade water and shipping the blanks with the sample bottles. Field blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. The field blanks will also be used to measure contaminant exposure (i.e. extractable organics, total metals, and cyanide) while in the field. The remaining sample containers will be filled with CLP-specific grade water and submitted for CLP laboratory analysis. Results of field blank analyses will be maintained with the corresponding sample analytical data in the project file.

Organic contaminates and some inorganic contaminates may volatilize during collection and subsequent shipment to the laboratory due to warming temperatures in the shipping container; therefore, a temperature blank will be monitored to insure that samples are properly cooled during shipment. One temperature blank per ice cooler will accompany the sample containers to the laboratory. Each temperature blank will be prepared by filling one VOA vial with deionized water, enclosing it in a bubble bag, taping the package to the interior of the ice cooler, and clearly marking it as the "temperature blank". Temperature blanks accompany the sample containers through collection and shipment to the laboratory and are stored with the samples. Results of shipment temperatures will be maintained with the corresponding sample analytical data in the project file.

Equipment rinsate sample(s) will be analyzed to detect possible sample contamination resulting from the use of non-dedicated sampling equipment and poor field decontamination procedures. Each equipment blank will be prepared by filling two VOA vials, one 1-gallon amber glass bottle, and two 1-liter polyethylene bottles with CLP-specified grade water collected from the final rinse of the decontaminated equipment. This sample will be packaged and shipped with the other samples. The equipment rinsate sample(s) will be analyzed for volatiles, semi-volatiles, pesticides/PCBs, metals

and cyanides. Results of equipment rinsate sample(s) analyses will be maintained with the corresponding sample analytical data in the project file.

Task 2: Decontamination Procedures

Equipment Decontamination

Proper decontamination procedures will aid in preserving the representativeness of the samples collected. Dedicated sampling equipment will be utilized whenever possible. If sample equipment (non-dedicated) must be used more than once in the field, then the decontamination procedures specified in the QAPP for sample equipment will be followed and an equipment rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater. To minimize cross contamination during processing and handling, the outside of each sample container will be wiped clean with clean paper towels prior to placing the container into a clean plastic bag and bubble-wrapping it for shipment. An effort will be made to keep the outside of sample containers free of gross contamination.

Decontamination fluids used to clean equipment will be disposed of in the approximate area of the sampling location in accordance with investigation derived waste (IDW) guidelines. Equipment decontamination will not be necessary for drinking water wells if the water sample is collected directly from a tap.

Personal Decontamination

All disposable clothing (i.e., Tyvek, gloves, etc.) will be rendered unusable prior to disposal to prevent inadvertent reuse. Boots will be scrubbed with detergent and rinsed with distilled water that will be disposed of on-site. Decontamination fluids from the non-dedicated equipment rinsate (if used) will also be disposed of on-site. Locations for IDW disposal will be noted in the field log book.

Task 3: Sample Shipping

During sampling activities, samples will be packed and preserved according to procedures described in the QAPP. Excess soil or liquid will be removed from the outside of each sample prior to placing it in a sealable plastic bag and placing it into an ice cooler packed with sealed ice bags. The Site Investigation Manager will assure that all appropriate paperwork necessary to ship samples to CLP laboratories for analysis is completed. Normally, a 35-day turnaround time for RAS will be requested. Details of the sample handling and chain-of-custody (COC) requirements are discussed in greater detail in the attached QAPP.

Samples collected each day will be shipped and delivered daily to the designated CLP laboratory for analysis using an overnight courier. The overnight freight courier pickup point and office schedule in the area of the facility is:

Airborne Express
5048 Timber Creek
Houston, Texas
Office hours - 8:00 a.m. to 7:00 p.m. Monday through Friday.
Call 1-(800)-247-2676 (1-800-AIR-BORN) to arrange for scheduled pickups.

The chain-of-custody forms will be checked, signed and placed in a sealable plastic bag and taped to the inside lid of the cooler. The outside of the cooler will be sealed with tamper-resistant tape which cannot be removed without tearing it. The sample custodian will sign across the seal prior to shipping the samples. In the event the shipper has to remove the cooler seal, the receiving laboratory will verify and record that the individual container, bottle or vial sample seals are still intact.

During sampling and sample shipment, the Site Investigation Manager (or his designee) will contact the CLP sample management office (SMO) representative, as designated on the CLP RAS Lab Assignment, each day that a shipment is sent. If there are any significant changes to the CLP analytical requirements, contact the TNRCC Central Office, Allan Seils, PA/SI Program Manager at (512) 239-2514, FAX (512) 239-4814 or his designee to coordinate and obtain approval for additional analytical requirements.

REFERENCES

1. U.S. Environmental Protection Agency. Federal Register - 40 CFR Part 300; Hazard Ranking System; Final Rule, Volume 55, No. 241, December 14, 1990. 135 pages.

2. U.S. Environmental Protection Agency. Hazard Ranking System Guidance Manual, EPA 540-R-92-026, OSWER Directive 9345.1-07, November 1992. 431 pages plus Appendix.

3. U.S. Environmental Protection Agency. Guidance for Performing Site Inspections Under CERCLA, Office of Emergency and Remedial Response, Hazardous Site Evaluation Division, Publication 9345.1-05, September 1992. 125 pages.

4. U.S. Environmental Protection Agency. 1996 Superfund Chemical Data Matrix (SCDM). June 1993.

5. LT Environmental, Inc. Site Characterization Report, Hercules Marine Service Site, Freeport, Brazoria County, Texas. 17 pages with appendices. June 1999.

6. Ecology and Environment. Environmental Priority Initiative (EPI) Preliminary Assessment of Fish Engineering Construction, Inc. (Marine Operations) (Presently Hercules Off-Shore Drilling Company), Freeport, Brazoria County, Texas (TXD980626121). Memorandum, From: Jairo Guevara, FIT Chemical Engineer, Thru: K. H. Malone, Jr. FITOM, To: Ed Sierra, Region VI RPO. 10 pages. August 2, 1989.

7. U.S. Environmental Protection Agency. Potential Hazardous Waste Site, Site Inspection Report. Gulfco (TX06432). 7 pages. July 15, 1980.

8. Guevara, Jairo, FIT Chemical Engineer, Ecology and Environment. Screening Site Inspection of Fish Engineering and Construction, Inc. (TXD980626121). 15 pages. Undated.

9. Ellison, Raymond H., Jr., President, Hercules Offshore Corporation, to Jairo A. Guevara, Ecology and Environment, Inc. Letter. December 8, 1989. 1 page with attachments.

10. Ellison, Raymond H., Jr., President, Hercules Offshore Corporation, to Jairo A. Guevara, Ecology and Environment, Inc. Letter. December 18, 1989. 1 page with attachments.

11. Chapter 7 U.S. Bankruptcy Court. Environmental Proof of Claim, Case Number 98-34630, Hercules Marine Service Corporation. 8 pages with attached exhibits. October 29, 1998.

12. U.S. Environmental Protection Agency. Screening Site Inspection Report, Gulfco Marine Maintenance, Inc. Site, CERCLIS #TXD055144539, July 2000. 91 pages with attachments.

13. Guevara, Jairo, FIT Chemical Engineer, Ecology and Environment. Screening Site Inspection of Hercules Offshore Corporation (TXD980626121). 14 pages. Undated.

14. Kennedy, Johnny W., Site Investigation Manager, Texas Natural Resource Conservation Commission, to Jack Palmer (Owner of Lot 56 of the Gulfco Site). Telephone Memo to the File. 1 page. January 11, 2000.

15. Texas Natural Resource Conservation Commission. Regional Office Checklist for Facilities in Bankruptcy. Hercules Marine Service Corporation. 3 pages. October 26, 1998.

16. State of Texas, County of Brazoria. General Warranty Deed. Volume 1485, pp. 359 - 366. November 12, 1970.

17. Davis, Harvey, Executive Director, Texas Department of Water Resources, to G. J. Gill, Senior Vice-President, Fish Engineering & Construction, Inc. Letter. May 21, 1982. 2 pages.

18. Davis, Harvey, Executive Director, Texas Department of Water Resources, to G. J. Gill, Senior Vice-President, Fish Engineering & Construction, Inc. Letter. June 21, 1982. 1 page.

19. Gill, G. J., Senior Vice-President, Fish Engineering & Construction, Inc., to Jay Snow, Texas Department of Water Resources, Solid Waste Section. Letter. April 29, 1982. 2 pages with attachments.

20. Texas Department of Water Resources. Industrial Sold Waste Disposal Compliance Monitoring Inspection. Fish Engineering and Construction. 6 pages with attachments. April 21, 1982.

21. Carden, Clair A., P. E., Consulting Engineer, to Mr. Glen J. Gill, Senior Vice-President, Fish Engineering & Construction, Inc. Letter. August 18, 1982. 1 page.

22. Ellison, Raymond H., Jr., President, Hercules Offshore Corporation, to Jairo A. Guevara, Ecology and Environment, Inc. Letter. December 8, 1989. 1 page with attachments.

23. Ellison, Raymond H., Jr., President, Hercules Offshore Corporation, to Jairo A. Guevara, Ecology and Environment, Inc. Letter. December 18, 1989. 1 page with attachments.

24. Gill, G. J., Senior Vice President, Fish Engineering & Construction, Incorporated, to Jay Snow, Texas Department of Water Resources, Solid Waste Section. Letter. August 4, 1982. 2 pages with attached sample analyses.

25. Nicholson, J. R., Vice President, Construction, Fish Engineering & Construction, Incorporated, to Gay Snow, Texas Department of Water Resources, Solid Waste Section. Letter. August 31, 1982. 1 page with attached sample analyses.

26. Nicholson, J. R., Vice President, Construction, Fish Engineering & Construction, Incorporated, to Jay Snow, Texas Department of Water Resources, Solid Waste Section. Letter. October 4, 1982. 2 pages with attached sample analyses and letter from Sammy Russo, Southern Petroleum Laboratories, Inc., to Clair A. Carden, P. E.

27. Nicholson, J. R., Vice President, Construction, Fish Engineering & Construction, Incorporated, to Jay Snow, Texas Department of Water Resources, Solid Waste Section. Letter. October 26, 1982. 2 pages with attached sample analyses and letter from Sammy Russo, Southern Petroleum Laboratories, Inc., to Clair A. Carden, P. E.

28. Kennedy, Johnny W., Site Investigation Manager, Texas Natural Resource Conservation Commission. Screening Site Inspection Field Logbook. Gulfco Marine Maintenance, Inc. Site, Freeport, Brazoria County, Texas. CERCLIS No. TXD055144539. January 24 through January 27, 2000. 78 pages.

29. U. S. Geological Survey, Freeport Quadrangle, Texas, 7.5 Minute Series. Topographic Map. 1964, Photorevised 1974. Base Map for Figures 1, 5 and 9. 1 page.

APPENDIX A

WELL DATA FOR ON-SITE WELLS
Fish Engineering & Construction, Inc.
Hercules Offshore Corporation

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 81-26-2
Located on map
Received:

1) OWNER:
Person having well drilled GULFCO, INC. (Name) Address P O DRAWER "O" - FREEPORT, TEX 77541 (Street or RFD) (City) (State)

Landowner DELTA MUD & CHEMICAL CO, INC. (Name) Address P O DRAWER "O" - FREEPORT, TEX 77541 (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County BRAZORIA, 3-Miles miles in Easterly (N.E., S.W., etc.) direction from Freeport, Texas (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*
Water well located approximately 2680 ft West of East Line and approximately 4200-ft North of South line of Frederick Calvit Survey, Abst 51, Brazoria County, Texas.
Sketch map of well location on reverse side.
(Use reverse side if necessary)

or

Give legal location with distances and directions from adjacent sections or survey lines.
Labor _____ League _____
Block _____ Survey Calvit
Abstract No. 51
(NW¼ NE¼ SW¼ SE¼) of Section _____

3) TYPE OF WORK (Check): New Well XX; Deepening; Reconditioning; Plugging

4) PROPOSED USE (Check): Domestic; Industrial XX; Municipal; Irrigation; Test Well; Other

5) TYPE OF WELL (Check): Rotary XX; Drive; Dug; Cable; Jetted; Bored

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 294 ft. Depth of completed well 294 ft. Date drilled 2-19-76
All measurements made from 00 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
00	30	Surface Soil 294-Ft Total Depth
30	125	Shale
125	140	Sand
140	192	Shale
192	197	Sand
197	214	Shale
214	222	Sand
222	267	Shale
267	268	Sand
268	274	Shale
274	292	Sand (Fine Grains)
292	294	Shale

(Use reverse side if necessary)

9) Casing: Type: Old; New XX Steel; Plastic XX; Other PVC Well Casing
Cemented from _____ ft. to _____

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
4½" OD	00' 10" Above Ground Level	277' 00"	Sched 40

Formation packs installed in annulus above screen section at 268-ft and 274-ft.

10) SCREEN: Type New Plastic Covered Steel Wire Wrapped Water Well Screen made on new 4½" OD x Sch Plastic PVC Pipe
Perforated XX; Slotted

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
4½" OD	277'00"	292'00"	.006-in Gap 0.006-in Gap

Lgth of Screen Pipe: 15-Ft
Lgth of Liner Pipe Below Screen Pipe: 2-ft

7) COMPLETION (Check): Straight wall XX; Gravel packed; Other; Under reamed; Open Hole

11) WELL TESTS:
Was a pump test made? Yes No XX If yes, by whom?
Well pumped by air-lift at 18-gal/min rate
Yield: _____ gpm with _____ ft. drawdown after _____
Bailer test _____ gpm with _____ ft. drawdown after _____
Artesian flow _____ gpm
Temperature of water _____

8) WATER LEVEL:
Static level 98 ft. below land surface Date 2-19-76
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., 212.5-ft ft. below land surface.
Well equipped with 3-HP x 19-Stage Sta-Rite Submersible Motor-Pump Unit.
Pump designed to deliver 32-gal/min vs total head of 200-ft.

12) WATER QUALITY:
Was a chemical analysis made? Yes XX No
Did any strata contain undesirable water? Yes No XX
Type of water? _____ depth of strata _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME RUSSELL B. HAYDEN (Type or Print) Water Well Drillers Registration No. 667

ADDRESS 1229 East Miller St (Street or RFD) Angleton (City) Texas 77515 (State)

(Signed) Russell B Hayden (Water Well Driller)

L. Patterson
P O Box 45 - Angleton, Texas 77515 (Company Name)

53001

Please attach electric log, chemical analysis, and other pertinent information, if available.

003173

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. _____
Located on map _____
Received: _____

1) OWNER Fish Engineering & Const. (Name) Address P. O. Drawer O (Street or RFD) Freeport, Texas 77541 (City) (State) (Zip)

2) LOCATION OF WELL: County Brazoria 1 miles in N. W. (N.E., S.W., etc.) direction from Surfside, Tx. (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☐ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☒ Test Well ☐ Other _____

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:

Date drilled _____

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	50

From (ft.)	To (ft.)	Description and color of formation material
0	29	clay
29	50	sand

Well #2 is located in East Corner of pond area, well screen was set from approximately 38' to 48'. Well was gravel packed from approximately 35' to 50' with bentonite seal set from approximately 30' to 35' with caseing extending approximately 2' out of ground as per customer instructions. Customer cemented well from ground level to approximately 30'

DESIGNATED "SOUTHEAST WELL" BY FISH ENGINEERING & CONSTRUCTION, INC.

(Use reverse side if necessary)

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from 35 ft. to 50

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	To
4	N	PVC	0	38
4	N	PVC Screen	38	48

CEMENTING DATA
Cemented from 0 ft. to 25'-30'
Method used _____
Cemented by Customer (Company or Individual)

9) WATER LEVEL:
Static level _____ ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

10) PACKERS: Type _____ Depth _____

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc. _____ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME R. D. Felder (Type or Print) Water Well Drillers Registration No. 1517.

ADDRESS P. O. Box 1033 200 Henderson Rd. Angleton, Texas 77515 (Street or RFD) (City) (State)

(Signed) _____ (Water Well Driller)

R. Felder Water Well and Pump Service (Company Name)

Electric log, chemical analysis, and other pertinent information, if available.

rev. 1-12-79

WELL OWNER'S COPY

003174

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only: Well No. ____ Located on map ____ Received: ____

1) OWNER Fish Engineering & Const. (Name) Address P. O. Drawer O (Street or RFD) Freeport, Texas 77585 (City) (State) (Zip)

2) LOCATION OF WELL: County Brazoria 1 miles in N.W. (N.E., S.W., etc.) direction from Surfside, Tx. (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter or Half Scale Texas County General Highway Map and attach the map to this form.

Legal description:
Section No. ____ Block No. ____ Township ____
Abstract No. ____ Survey Name ____
Distance and direction from two intersecting section or survey lines ____
☐ See attached map.

3) TYPE OF WORK (Check)
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☒ Test Well ☐ Other ____

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ____

6) WELL LOG:

Date drilled ____

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	50

From (ft.)	To (ft.)	Description and color of formation material
0	12	clay
12	15	sand
15	50	clay

Well #3 is located in South Corner of pond area, well screen was set from approximately 38' to 48'. Well was gravel packed from approximately 35' to 50' with Bentonite seal set approximately 30' to 35' with caseing extending approximately 2' out of ground as per customer instructions. Customer cemented well from ground level to approximately 30'

DESIGNATED "SOUTHWEST WELL" BY FISH ENGINEERING & CONSTRUCTION, INC.

(Use reverse side if necessary)

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other ____
If Gravel Packed give interval ... from ____ ft. to ____

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage or SDR
4	N	PVC	0	38	
4	N	PVC Screen	38	48	

CEMENTING DATA
Cemented from 0 ft. to 25'-30'
Method used ____
Cemented by customer (Company or Individual)

9) WATER LEVEL:
Static level ____ ft. below land surface Date ____
Artesian flow ____ gpm. Date ____

10) PACKERS: Type Depth

11) TYPE PUMP:
Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ____
Depth to pump bowls, cylinder, jet, etc. ____ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME R. O. Felder (Type or Print) Water Well Drillers Registration No. 1517

ADDRESS P. O. Box 1033 200 Henderson Rd. Angleton, Texas 77515 (Street or RFD) (City) (State)

(Signed) ____ (Water Well Driller) R. Felder Water Well and Pump Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

WELL OWNER'S COPY

01/08/2000

003175

Send original copy by mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas

WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Well No.
Located on map
Received

1) OWNER Fish Engineering & Const. (Name) Address P. O. Drawer 0 (Street or RFD) Freeport, Texas 77541 (City) (State)

2) LOCATION OF WELL County Brazoria 1 miles in N.W. (N.E., S.W., etc.) direction from Surfside, Tx. (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter or Half Scale Texas County General Highway Map and mark the well location thereon.

Legal description:
Section No. ____ Block No. ____ Township ____
Abstract No. ____ Survey Name ____
[illegible] Lines.
See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Screening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation XX ☐ Test Well ☐ Other ____

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Cable ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ____

6) WELL LOG

Date drilled ____

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	50

From (ft.)	To (ft.)	Description and color of formation material
0	30	clay
30	45	sand
45	50	clay

Well #1 is located in North corner of pond area, well screen was set from approxiately 33' to 48'. Well was gravel packed from approximately 35' to 50' with Bentonite seal set from approximately 30' to 35' with ceseing extending approximately 2' out of ground as per customer instructions. Customer cemented well from ground level to approximately 30'.

DESIGNATED "NORTHEAST WELL" BY FISH ENGINEERING & CONSTRUCTION, INC.

(Use reverse side if necessary)

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
XX ☒ Gravel Packed ☐ Other ____
If Gravel Packed give interval . . . from 35 ft. to 50

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf. Slotted, etc. Screen Mfgr., if commercial	Setting (ft.) From	To
4	N	PVC	0	38
4	N	PVC Screen	38	48

CEMENTING DATA 0 25'-30'
Cemented from ____ ft. to ____
Method used ____
Cemented by customer (Company or individual)

9) WATER LEVEL:
Static level ____ ft. below land surface Date ____
Artesian flow ____ gpm. Date ____

10) PACKERS: Type ____ Depth ____

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ____
Depth to pump bowl, cylinder, jet, etc. ____ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Other
Yield: ____ gpm with ____ ft. drawdown after ____

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME R. D. Felder Water Well Drillers Registration No. 1517

ADDRESS P. O. Box 1033 (Type) 200 Henderson Rd. Angleton, Texas 77515 (Street or RFD) (City) (State)

(Signed) ____ (Water Well Driller)

R. Felder Water Well and Pump Service (Company Name)

*Each electric log, chemical analysis, and other pertinent information available

ATTACHME

003176

Mail original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only: Well No. ____ Located on Map ____ Received ____

1) OWNER Fish Engineering & Const. (Name) Address P. O. Drawer O (Street or RFD) Freeport, Texas 77541 (City) (State) (Zip)

2) LOCATION OF WELL: County Brazoria 1 miles in N.W. (N.E., S.W., etc.) direction from Surfside, Tx. (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ____ Block No. ____ Township ____
Abstract No. ____ Survey Name ____
Distance and direction from two intersecting section or survey lines ____
☐ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☒ Test Well ☐ Other ____

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ____

6) WELL LOG: Date drilled ____

DIAMETER OF HOLE Dia (in.)	From (ft.)	To (ft.)
6 3/4	Surface	50

From (ft.)	To (ft.)	Description and color of formation material
0	50	clay

Well #4 is located in West corner of pond area, well screen was set from approximately 38' to 48'. Well was gravel packed from approximately 35' to 50' with bentonite seal set approximately 30' to 35' with casing extending approximately 2' out of ground as per customer instructions. Customer cemented well from ground level to approximately 30'

DESIGNATED "NORTHWEST WELL" BY FISH ENGINEERING & CONSTRUCTION, INC.

(Use reverse side if necessary)

7) BOREHOLE COMPLETION: ☐ Open Hole ☒ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other ____
If Gravel Packed give interval . . . from ____ ft. to ____

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	To
4	N	PVC	0	38
4	N	PVC Screen	38	48

CEMENTING DATA 0 25'-30'
Cemented from ____ ft. to ____
Method used ____
Cemented by Customer (Company or Individual)

9) WATER LEVEL:
Static level ____ ft. below land surface Date ____
Artesian flow ____ gpm. Date ____

10) PACKERS: Type ____ Depth ____

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pumpbowls, cylinder, jet, etc. ____ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME R. D. Felder (Type or Print) Water Well Driller's Registration No. 1517

ADDRESS 200 Henderson Rd. (Street or RFD) P. O. Box 1033 (City) Angleton, TExas 77515 (State)

(Signed) ____ (Water Well Driller) R. Felder Water Well and Pump Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TWB-0582 (Rev. 11-12-79) WELL OWNER'S COPY 4 1103 1980

003177

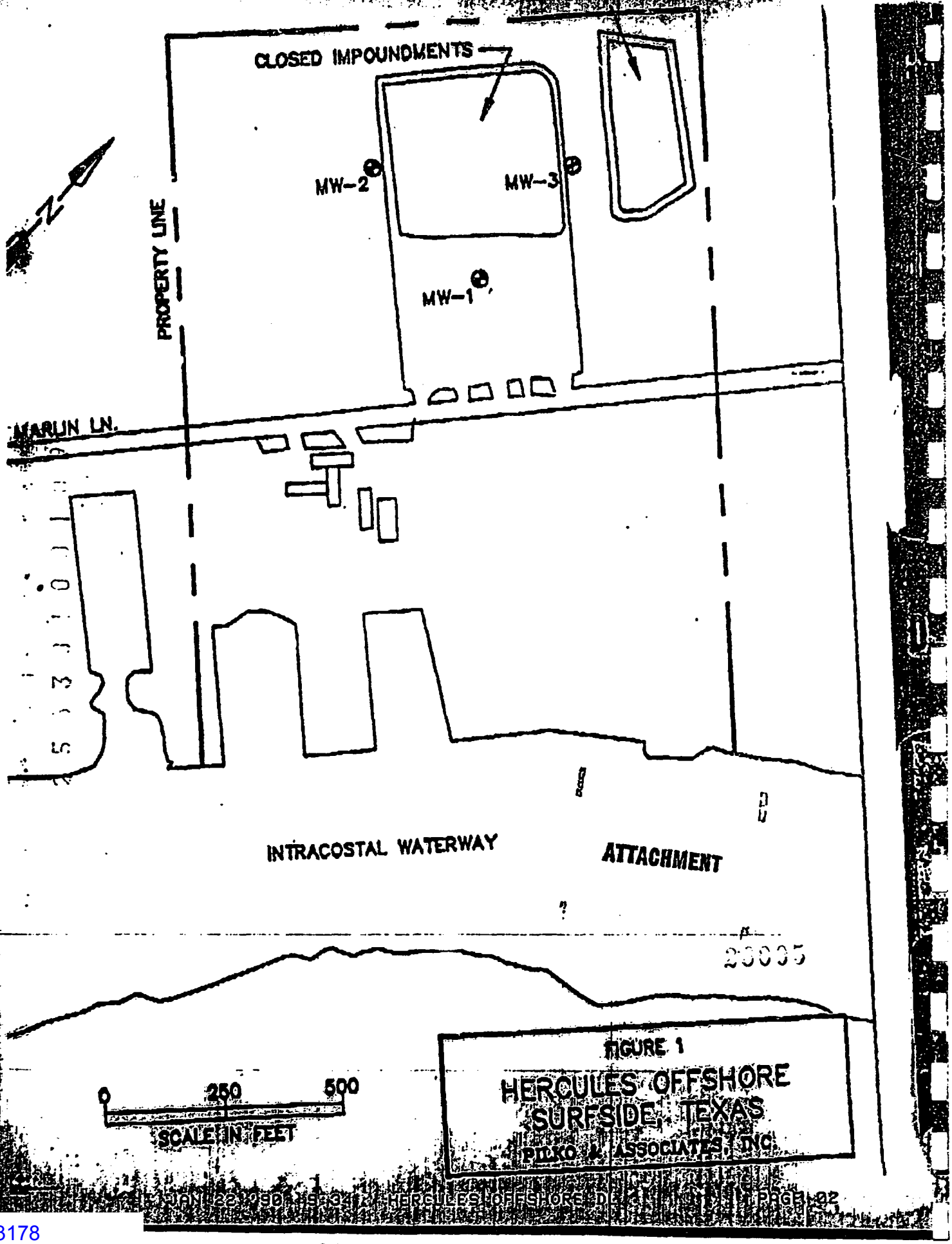


FIGURE 1

HERCULES OFFSHORE
SURFSIDE, TEXAS

PIKO & ASSOCIATES, INC.

LOG & AS-BUILT DIAGRAM

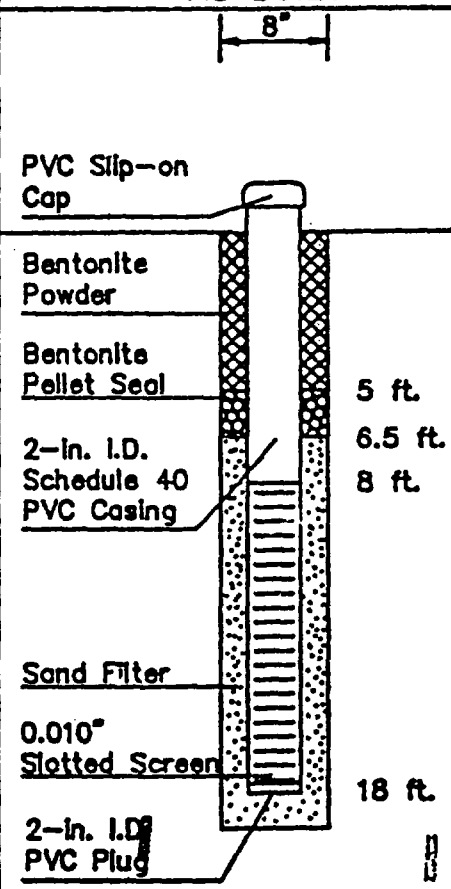
7600-4

GEOLOGIST: J. BUCHANAN
DRILLER: PSI
DRILLING METHOD: HOLLOW STEM

COMPLETION DATE: 01-09-89
TOP OF CASING ELEV.:
GROUND SURFACE ELEV.:

GEOLOGIC LOG	SAMPLE TYPE	BLOWS/FOOT	LOG DEPTH IN FEET	WATER LEVEL
GROUND SURFACE			0	
Dark brown silty clay				
Greenish grey and red mottled silty clay OVA at 5' = trace			5	
Brown silty sand			10	
			15	
Total Depth = 18 Ft.			20	
			25	
			30	
			35	

AS BUILT



ATTACHMENT

2000

PIKO & ASSOCIATES, INC.

Hercules Offshore

MW-3

Job No.: 7600
January 1989
Page 1 of 1

003179

01/08/2000

LOG & AS-BUILT DIAGRAM

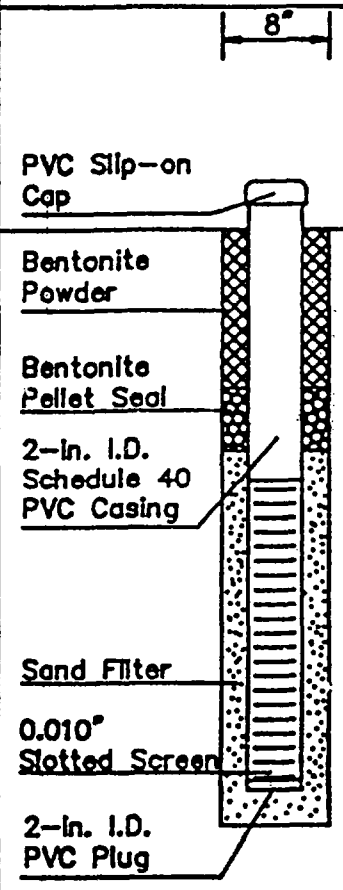
7600-3

GEOLOGIST: J. BUCHANAN
DRILLER: PSI
DRILLING METHOD: HOLLOW STEM

COMPLETION DATE: 01-09-89
TOP OF CASING ELEV.:
GROUND SURFACE ELEV.:

GEOLOGIC LOG	SAMPLE TYPE	BLOWS/FOOT	LOG DEPTH IN FEET	WATER LEVEL
GROUND SURFACE			0	
Dark brown silty clay				
Grey silty clay OVA at 5' = 10 ppm			5	
Brown silty sand and sandy clay			10	
			15	
Total Depth = 18 Ft.			20	
			25	
			30	
			35	

AS BUILT



ATTACHMENT

PITKO & ASSOCIATES, INC. | Hercules Offshore | MW-2 | Job No. 7600 | January, 1989 | Page 1 of 1

003180

01/08/2000

7600-2

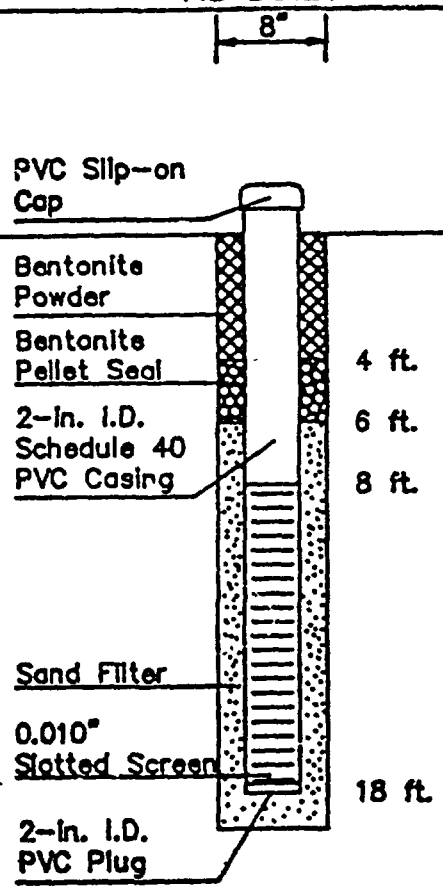
LOG & AS-BUILT DIAGRAM

GEOLOGIST: J. BUCHANAN
DRILLER: PSI
DRILLING METHOD: HOLLOW STEM

COMPLETION DATE: 01-09-89
TOP OF CASING ELEV.:
GROUND SURFACE ELEV.:

GEOLOGIC LOG	SAMPLE TYPE	BLOWS/FOOT	LOG DEPTH IN FEET	WATER LEVEL
GROUND SURFACE			0	
Dark brown silty clay				
Grey silty clay OVA at 5' = 0 ppm			5	
Brown silty to clayey sand			10	
			15	
Red and grey silty clay			20	
Total Depth = 18 Ft.			25	
			30	
			35	

AS BUILT



ATTACHMENT

PILKO & ASSOCIATES, INC.

Hercules Offshore
MW-1

Job No: 7600
January 1989
Page 1 of 1

003181

01/08/2000

APPENDIX B

Gulfco Marine Maintenance, Inc.
Health and Safety Plan

HEALTH AND SAFETY PLAN
FOR
SCREENING SITE INSPECTION FIELD WORK
GULFCO MARINE MAINTENANCE, INCORPORATED

Prepared by

Texas Natural Resource Conservation Commission
Superfund Site Discovery and Assessment Team
Austin, Texas

Reviewed and approved by

Site Safety Officer:	_____ Name	_____ Date
Site Investigation: Manager	John W. Blevins Name	1/8/01 Date
PA/SI Program Manager Representative:	Allen H. Gibbs Name	1/12/01 Date
TNRCC Central Office Health & Safety Representative:	John Lyer Name	1/11/01 Date

January 2001

Contents

APPENDICES

FIGURES

TABLES

EMERGENCY CONTACTS

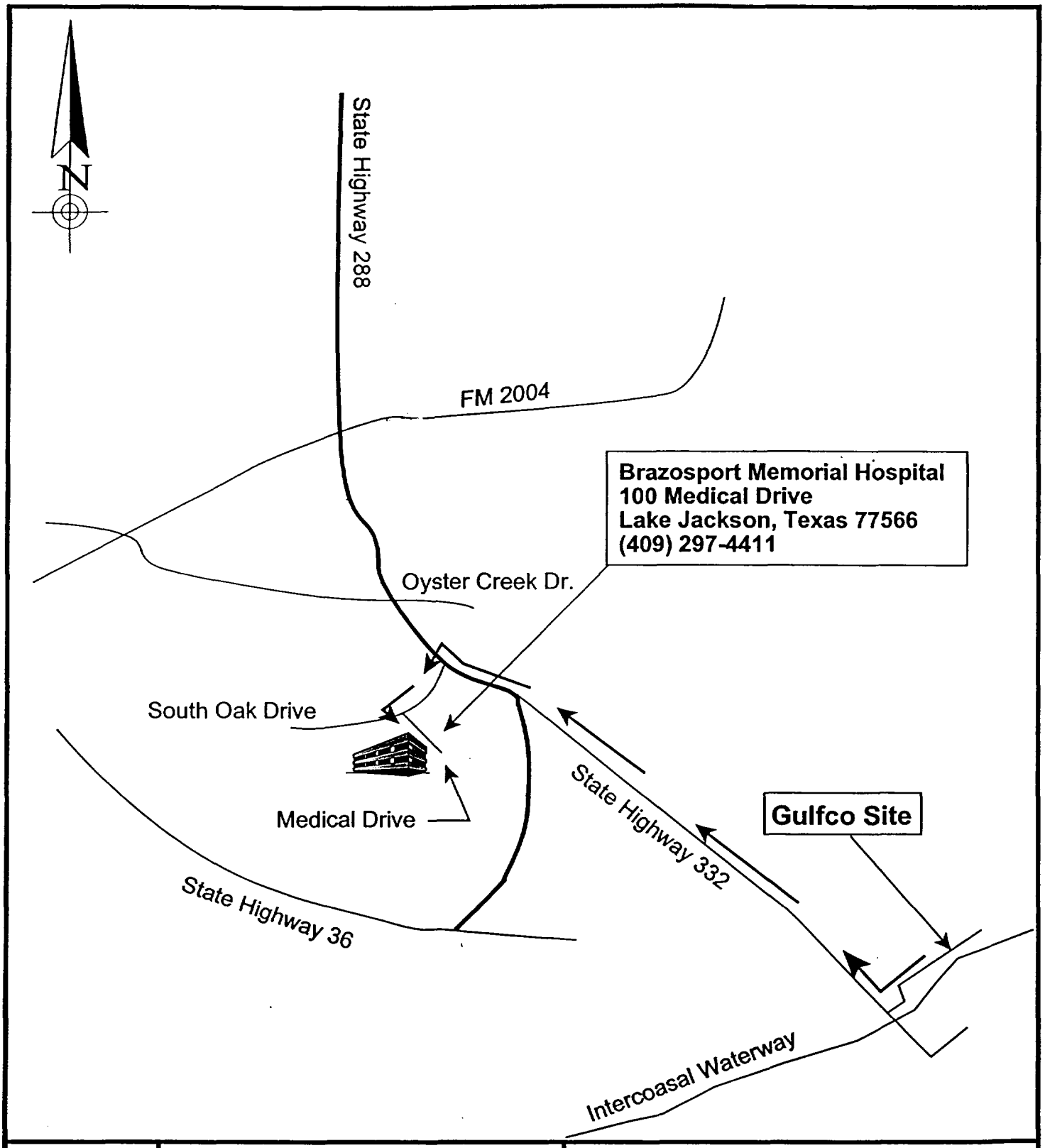
In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations contact the appropriate response teams:

Site Location:	**Latitude 28^0 58' 07" N**	**Longitude 95^0 17' 26" W**

Contingency Contacts	Phone Number
Fire Department	911
Police	911
Sheriff's Department	911
Ambulance	911

Medical Emergency	
Hospital Name	Brazosport Memorial Hospital
Hospital Address	100 Medical Drive Lake Jackson, Texas 77566 Phone No. (409) 297-4411
Map to Hospital (see next page)	

TNRCC Contacts	
TNRCC PA/SI Program Manager:	Allan M. Seils- Austin, Texas Phone: Work (512) 239-2514 Pager: (512) 875-5108
TNRCC Central Office Health & Safety Representative:	John C. Syer - Austin, Texas Phone: Work (512) 239-4136 Pager: (512) 875-5119
TNRCC Field Health & Safety Representative:	Johnny W. Kennedy Phone: Work (713) 767-3552



TNRCC

Figure 1

Map to Hospital

Gulfco Site

Freeport, Brazoria County, Texas

CERCLIS No. TXD055144539

SECTION 1

INTRODUCTION

PURPOSE AND POLICY

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for work conducted for Expanded Site Inspections (ESI) under the Texas Natural Resource Conservation Commission (TNRCC) Preliminary Assessment/Site Investigation (PA/SI) program. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while field work is being conducted at the Gulfco Marine Maintenance, Incorporated (Gulfco) site in Brazoria County, Texas.

All personnel who engage in field project activities at the site must be familiar with this plan and comply with its requirements. The provisions of the plan are mandatory for all TNRCC field personnel on this project.

PROGRAM DESCRIPTION

This Expanded Site Inspection will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS) 40 CFR Part 300; Final Rule, dated December 14, 1990. TNRCC Region 12 staff recently completed collecting information needed to prepare a work plan and this health and safety plan. TNRCC Region 12 and Central Office staff personnel may visit the site to assist in executing the work plan and/or conduct inspection activities. Activities that will be conducted during the site visit include: site reconnaissance, interviews with adjacent property and/or well owners, and the collection of ground water samples from on-site monitor wells and the collection of ground water samples from on-site and off-site locations using a direct-push sampling probe. The anticipated time frame for the execution of all the field work is January 2001. This health and safety plan pertains to activities performed while executing the work plan.

SECTION 2

SITE INFORMATION

GENERAL INFORMATION

Site: Gulfco Marine Maintenance, Incorporated TXD055144539

Location: The Gulfco Marine Maintenance, Incorporated (Gulfco) site is located at 906 Marline Avenue, Freeport, Brazoria County, Texas. The site is approximately 40 acres in size, with about half the acreage being on the north side of Marlin Avenue and the remaining acreage being on the south side of Marlin Avenue. The main facility part of the site is located on the southern portion of the site. The site is bound on the north by undeveloped land, on the east by commercial/industrial properties, on the west by vacant land, a barge slip, and residential housing, and on the south by the Intercoastal Waterway. The geographic coordinates for the site are 28° 58' 07" N Latitude and 95° 17' 26" W.

Mailing Address: None

Proposed date of field work: January 2001

Hazard Assessment: ___ High ___✓___ Medium ___ Low

___ None ___ Unknown

Site description:
Gulfco Marine Maintenance, Inc. operated site as a barge cleaning facility from 1971 through 1979. Waste wash waters generated during the cleaning operations were reportedly stored in three (3) surface impoundments located on Lot 56 on the north side of Marlin Avenue. Fish Engineering and Construction (Fish) purchased the site in November 1979 and utilized the site for similar barge cleaning and servicing operations and offshore platform construction. In 1981, Fish deactivated the surface impoundments and began closure activities. These surface impoundments were reportedly certified close and covered with a hard wearing surface in August 1982. Hercules Offshore Corporation (Hercules) purchased the majority of the site in January 1989, with the exception of Lot 56 which contained the former surface impoundments. Fish retained ownership of Lot 56 where the former surface impoundments were located. Hercules continued barge cleaning and refurbishing operations at the site. Hercules entered Chapter 7 bankruptcy on May 4, 1998. In mid 1999, the portion of the Gulfco site previously owned by Hercules was purchase through the bankruptcy court by LDL Coastal L.L.C. Lot 56 of the original site was purchased by Messrs. Jack Palmer and Ron Hudson sometime in 1999.

The site is basically inactive. LDL Coastal has removed most of the surface debris on the southern portion of the site, with the intent of either leasing the site to a future tenant or selling the site. The northern part of the site including Lot 56 remains vacant land.

Waste materials may remain on-site. These waste materials most likely are contained within aboveground storage tanks and miscellaneous containers. Waste source areas evaluated during a January 2000 SSI included contaminated soil and the "fresh water ponds". The primary focus of this ESI will be to evaluate whether there has been a release of contaminants from the former surface impoundments to the shallow ground water along the ground water pathway.

SCOPE OF WORK SUMMARY

During the ESI sampling event, the field team will conduct an off-site reconnaissance, and collect ground water samples from on-site monitor wells and from on-site and off-site locations using a direct-push sampling probe. A total of fifteen (15) ground water (GW) samples including duplicates will be collected during this sampling event. These ground water samples will be collected to determine whether a release(s) of on-site contaminants from the former surface impoundments has impacted the shallow aquifer beneath the site, and to determine whether a potential impact to the aquifer has migrated off-site along the ground water migration pathway.

All samples will be collected according to the procedures outlined in the QAPP, included as Appendix C in the Work Plan.

SITE/CHEMICAL CHARACTERISTICS

Chemical type(s):	✓ Liquid	✓ Solid	✓ Sludge	___ Gas
Characteristic(s):	___ Corrosive	✓ Ignitable	___ Radioactive	
	✓ Volatile	✓ Toxic	✓ Reactive	
	✓ Unknown	___ Other		

Summary of known wastes:
Waste materials at the site were reportedly generated during cleaning and servicing of barges moored in the Intercoastal Waterway and barge slips located at the site. Two waste sources related to the barge cleaning and servicing operations were evaluated by surficial and shallow subsurface soil and sediment sampling during the January

2000 Screening Site Inspection. These waste sources included contaminated soil and the "fresh water ponds".

The three (3) former surface impoundments located on Lot 56 were not adequately evaluated as a potential waste source area during the January 2000 SSI sampling event. Gulfco Marine Maintenance, Incorporated began operating the earthen surface impoundments at the site in 1971 to store wash waters generated during the cleaning of barges transporting various oils, caustics, and organic chemicals. The surface impoundments were apparently lined with a natural clay layer and interconnected by overflow pipes. Fish Engineering purchased the site in 1979 and continued to utilize the surface impoundments until 1981 when they were deactivated. Samples collected during the closure actives indicated detectable levels of benzene, phenols, oil and grease, organic halogens, total organic carbon, and volatiles. The liquids held in the surface impoundments were all removed, as were the majority of the accumulated sludges. Reportedly, about 100 cubic yards of sludge remained, mostly in surface impoundment 2 (the largest of the three). The remaining sludges were solidified with soil before the surface impoundment were covered and capped with the hard wearing surface in 1982.

Description of all known waste disposal areas on site:
With the exception of the three (3) former surface impoundments, known waste sources were evaluated through environmental sampling during the January 2000 SSI investigation. This purpose of this ESI investigation is to evaluate the former surface impoundments as a potential waste source area and to evaluate the potential impact of a release of contaminants related to the former surface impoundments to the shallow ground water.

The former surface impoundments were operated from 1971 to 1981 to wash waters generated during barge cleaning activities. They have been described as earthen pits of an unknown depth, lined with a natural clay layer. The approximate dimensions were as follows: Impoundment 1 (southeast) was 156 feet long by 96 feet wide, Impoundment 2 (west) was 330 feet long by 197 feet wide, and Impoundment 3 (northeast) was 145 feet long by 96 feet wide. Closure of the surface impoundments reportedly involved the removal of the contained liquids, removal of the majority of the sludges, solidifying the remaining sludge with soil, and capping the surface impoundments with a three foot clay cover. A hard wearing surface was then installed above the clay cover. The surface impoundments were certified closed by Clair a. Carden, P. E., pursuant to an August 18, 1982 letter to Mr. Glen J. Gill, Senior Vice-President of Fish Engineering.

Site waste management history:
Barges brought to the Gulfco site were drained of approximately 300 gallons of product heels and stored in product aboveground storage tanks for subsequent resale. Empty barges were washed with detergent and water from either the City of Freeport or underground water from two on-site wells. An average of 9000 gallons of water or detergent solution were used for each barge. Wash waters generated during the barge cleaning operations were originally stored in the three surface impoundments located on Lot 56. Following closure of these surface impoundments, the wash waters were stored first in a floating barge moored in the Intercoastal Waterway and then in large aboveground storage tanks. The accumulated waste were stored until a sufficient quantity was accumulated for disposal.

Other operations at the site included servicing and repairing barges. Reportedly, these operations involved sandblasting and painting.

Unusual features (surface impoundment/tank integrity, power lines, terrain, etc.):
The site is divided into two sections separated by Marlin Avenue. The north side of the site consists of Lots 55 through 58 of the Bridge Harbor Division. Each of the four lots is approximately 5 acres in size. The southern portion of the site on the south side of Marlin Avenue consists of Lots 21 through 25 of the Bridge Harbor Division. Each of the five lots is approximately 4 acres in size.

The lots on the north side of Marlin Avenue are vacant. The former surface impoundments were located on Lot 56, however, these surface impoundments were deactivated in 1981, certified closed in 1982, and the area covered with a hard wearing surface. A large fresh water pond and a small fresh water pond are located on Lot 55. No other features are known on the north portion of the site.

The southern part of the site is considered the main facility and is bordered on the south by the Intercoastal Waterway. Primary features located on this part of the site include two (2) barge slips, a dry dock area, several buildings, a concrete bermed aboveground storage tank area, several sand aboveground storage tanks, an electrical shed, and a former wash water storage area. It is unknown whether any of the above aboveground storage tanks contain liquids at this time.

Current status of site:
The site is currently inactive. LDL Coastal, Incorporated purchased the site with the exception of Lot 56 through the Chapter 7 bankruptcy court. LDL Coastal has removed the majority of the surface debris from the site with the intention of leasing the site in the future or selling the site. The northern portion of the site including Lot 56 remains as vacant land.

Summary of the regulatory history of the site:
The Gulfco site was operated by Gulfco Marine Maintenance, Incorporated as a barge cleaning facility from 1971 through 1979. Waste materials generated during the cleaning operations were reportedly stored in three (3) surface impoundments located on Lot 56 on the north side of Marlin Avenue.

In November 1979, Fish Engineering and Construction (Fish) purchased the site from Gulfco Marine Maintenance, Incorporated. Fish conducted similar barge cleaning and servicing operations and offshore platform construction.

In 1981, Fish deactivated the surface impoundments and began closure activities. These surface impoundments were reportedly closed, covered with a hard wearing surface, and certified as closed by the Texas Department of Water Resources in August 1982.

In January 1989, the majority of the site was purchased by Hercules Offshore Corporation (Hercules). Fish retained ownership of Lot 56 where the former surface impoundments were located. Hercules only conducted barge cleaning and refurbishing operations at the site.

On May 4, 1998, Hercules entered Chapter 7 bankruptcy.

In June 1999, LT Environmental, Incorporated submitted a Site Characterization Report to LDL Coastal, Inc. following site assessment activities at the Gulfco site. Subsequently in mid-1999, LDL Coastal, Inc. purchased the portion of the Gulfco site previously owned by Hercules through the bankruptcy court.

Sometime in 1999, Messrs. Jack Palmer and Ron Hudson purchased the Lot 56 of the original Gulfco site from KTI Fish (KTI purchased Fish Engineering to form KTI Fish).

From January 25 - 27, 2000, a Screening Site Inspection site investigation was conducted at the Gulfco site.

SECTION 3

PROJECT TEAM ORGANIZATION

Table 3.1 describes the responsibilities of all staff and on-site personnel associated with this project. The names of individuals associated with this project are listed below:

TNRCC PA/SI Program Manager:	Allan M. Seils, Austin, Texas
Staff Safety Officer:	John C. Syer, Austin, Texas
Site Investigation Manager:	Johnny W. Kennedy, Houston, Texas
Assistant:	To Be Determined.
Site Safety Officer:	To Be Determined

Personnel - The Site Project Manager designates the Site Health and Safety Officer who will be responsible to see that the site work is performed in a manner consistent with the Health and Safety Plan (HASP).

The Site Health and Safety Officer will be responsible for Health and Safety briefings before each daily on-site inspection.

The Site Project Manager or the Site Health and Safety Officer may temporarily suspend field activities if health and safety of personnel are endangered. The Site Project Manager or the Site Health and Safety Offer may temporarily suspend an individual from the field activities for infractions of the HASP.

Table 3.1
Staff and On-site Personnel

Title	General Description	Responsibilities
PA/SI Program Manager/ Deputy	Reports to upper-level management. Has authority to direct site investigation activities. Assumes responsibility of meeting all PA/SI program goals/objectives.	Prepares, organizes, and provides program support material. Reviews/approves the project Work Plan, Health and Safety Plan, and the Quality Assurance Project Plan. Appoints field team members for the field work. Briefs the Site Investigation Manager on his specific duties. Ensures, through the Staff Safety Officer, that safety and health requirements are met. Serves as the liaison with the Region VI EPA Representative.
Staff Safety Officer	Advises the PA/SI Program Manager on all aspects of health and safety. Reviews Health and Safety Plans submitted to Central Office.	Advises the PA/SI Program Manager on all health and safety issues. Reviews all project Health and Safety Plans to assure proper clothing and protective equipment are identified. Ensures that the proper protective clothing and safety equipment are available for the field investigation efforts.
Site Safety Officer	Advises the Site Investigation Manager on all aspects of health and safety. Assures proper field safety is implemented according to the project Health and Safety Plan.	Ensures that entry and exit controls at the site access control points are in place and maintained. Periodically inspects protective clothing and equipment. Confirms each team member's suitability for work based on a physician's recommendation. Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue. Implements the health and safety plan. Conducts periodic inspections to determine if the project Health and Safety Plan is being followed. Enforces the buddy system.

Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Safety Officer (Continued)		Notifies, when necessary, local public emergency officials in coordination with on-site representatives. Coordinates emergency medical care. Ensures setup of decontamination lines and solutions appropriate for the type of chemical contamination on the site. Controls decontamination of all equipment, personnel, and samples from the contaminated areas. Ensures proper disposal of contaminated clothing and materials. Advises medical personnel of potential exposures and consequences. Notifies emergency response personnel by telephone or radio in the event of an emergency. Ensures that all personnel can appropriately use the equipment.
Site Investigation Manager	Prepares Work Plan, and Health and Safety Plan for review/approval. Responsible for field investigation phase of the project.	Obtains permission for site access from the property owners or their representatives. Coordinates all field activities with the appropriate local community officials. Prepares the Work Plan and Health and Safety Plan for Central Office review/approval. Ensures that the work plan is complete and submitted to meet schedule requirements. Executes the Work Plan, Health and Safety Plan, and assures QAPP requirements are met according to the project schedule. Enforces safety procedures through the Site Safety Officer. Documents field activities and sample collection efforts. Serves as a liaison with the on-site client representative.

Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Investigation Manager (Continued)		Prepares and submits the final report and required support documentation for Central Office approval.
Field Team Members	Perform field activities as instructed by Site Investigation Manager.	Safely complete the on-site tasks required to fulfill the work plan. Notify Site Safety Officer or supervisor immediately of suspected or noted unsafe conditions observed in the field. Take precautions necessary to prevent injury to themselves and other employees. Read, sign-off, and comply with the project Health and Safety Plan before entering the site for field activities. Maintain visual contact between partners (buddy system). Perform only those tasks they believe they can do safely. Immediately report to the field team leader any accidents and/or unsafe conditions, or any deviations from the Health and Safety Plan.

SECTION 4

SAFETY AND HEALTH RISK ANALYSIS

RESPIRATORY HAZARDS

Respiratory hazards may exist on-site due to the waste materials remaining within the aboveground storage tanks and from contaminated soils on the ground surface.

The potential exists for the inhalation of contaminants from the known waste source areas and from unknown waste source areas. Organic vapors may be present at the site and airborne particulates may pose an inhalation hazard during soil sampling activities. If adverse weather (i.e., high winds) lead to conditions posing potential respiratory hazards, operating procedures will be modified as required.

If these conditions occur at the site, work will be conducted upwind of the hazard. If wind conditions change or the sampling activities result in the release of toxic vapors or particulates, the site will be evacuated, as necessary, to minimize unnecessary exposure or, appropriate safety protection will be used.

CHEMICAL HAZARDS

Chemical hazards can exist when liquid, vapors, or soils contact human tissue. Every effort will be made to avoid inadvertent contact with the chemical media at the site. This ESI will involve the collection of ground water samples from existing monitor wells at the site, and the collection of ground water samples from on-site and off-site locations using a direct-push sampling probe. Field personnel may come into contact with contaminated media during the collection of potentially contaminated ground water samples, and/or field personnel may encounter contaminated soils while using the direct-push sampling probe. Therefore, field personnel will utilize protective equipment to avoid physical contact.

Information on potential contaminants that may be encountered at the Gulfco site is presented in Section 2. This information is based upon the site operational history and previous inspections of the site by TNRCC, USEPA representatives, and a Site Characterization report prepared for LDL Coastal by LT Environmental, Inc. Table 4.1 lists the contaminants found to be hazardous during previous sampling events. The site may contain other hazardous chemicals that may release hazardous or toxic vapors. The site will be approached with caution. Moving or handling of drums, containers, or equipment will be avoided.

During the course of the field investigation, certain chemicals are used for the preservation of samples, decontamination of equipment and calibration of equipment. The chemicals of record used during field investigations are shown in Table 4.2. Some or all of the chemicals shown in this table may be used during the sampling event at the Gulfco site. Proper protective equipment will be utilized when working with these chemicals. All personnel should avoid inhalation of chemical vapors or contact with the skin.

ROUTES OF EXPOSURE

The field team may be exposed to contaminated materials through inhalation, ingestion, and/or skin and eye contact.

- Respiratory system contact with hazardous airborne materials can occur. If these conditions exist, field work will be conducted upwind, proper protective equipment will be used, or the site will be evacuated.

- Eye contact with contaminated solid or liquid samples can occur when a worker does not wear safety glasses while samples are being taken or handled.

- Skin contact with contaminated solid or liquid samples can occur when a worker does not wear gloves and protective clothing during sampling activities.

- Gastrointestinal system contact with samples can occur when workers do not observe personal hygiene rules designed to reduce the chance of ingesting site contaminants (i.e., wash hands before smoking, eating, or drinking).

PHYSICAL HAZARDS

Inactive Sites

The site is currently inactive. LDL Coastal has removed the majority of the surficial debris from the main part of the site south of Marlin Avenue. However, waste materials may remain on-site. These materials are stored in aboveground storage tanks, drums, and miscellaneous containers. In addition, waste materials may be present on the ground surface. There may be unknown physical hazards encountered during site sampling events that could cause physical injury. Physical hazards include, but are not limited to aboveground storage tank areas, waste piles, above ground structures, potential spill areas, uneven topography, sharp objects scattered about the site, snakes, mosquitoes, fire ants, and poison ivy. Field work should be performed using all normal safety precautions. The Health and Safety Plan guidelines concerning avoiding physical hazards will be followed, as a minimum. In addition,

- Unnecessary moving or opening any heavy or bulky containers, drums, bags, etc., will be avoided;

- The "buddy" system will be used at all times;

Table 4.1 Selected chemicals that may be present at the Gulfco site (From NIOSH & ACGIH Pocket Guides)

Possible Chemical Contaminants	**NIOSH REL** (Recommended exposure level for 10 hr wk day/40 hr week) ST (short term exposure level/15 minutes)	**PEL** (Permissible exposure limit for 8 hr days in a 40 hr week) ST (short term exposure level/15 minutes)	**TLV** (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	**IDLH** (Immediate Dangerous to life or health concentrations	**Symptoms of Exposure** (inhalation; skin absorption)
1,2-dichloroethane (Ethylene dichloride)	1 ppm (4 mg/m^3) ST = 2 ppm (8 mg/m^3) Ca	50 ppm (OSHA PEL vacated in 1993, PEL values shown est. 1971)	**	50 ppm	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, nausea, vomit, derm, liver, kidney
1,1-Dichloroethene (Vinylidene chloride)	Ca - NIOSH recommends occupational exposure limited to lowest feasible concentration	None	**	Ca [N.D.]	Inhalation, Ingestion, Absorption, Contact: Irrit eyes, skin, throat, dizziness, headache, nausea
Trichlorofluoromethane (Fluorotrichloromethane)	C 1000 ppm (5600 mg/m^3)	1000 ppm (5600 mg/m^3)	**	2000 ppm	Inhalation, Ingestion, Contact: tremors, cardiac arrest, asphyxia
1,1,1 Trichloroethane (Methyl chloroform)	C 350 ppm 1900 mg/m^3) [15-min]	350 ppm (1900 mg/m^3)	**	700 ppm	Inhalation, Ingestion, Contact: Irrit eyes, skin, headache, poor equalibrium
toluene	100 ppm (375 mg/m^3) ST = 150 ppm (560 mg/m^3)	200 ppm C = 300 ppm	**	500 ppm	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, nose; ftg, weak. Dizz. Dilated pupils; Insom.
Carbon tetrachloride	ST = 2 ppm (12.6 mg/m^3) [60 min]	10 ppm C = 25 ppm	**	200 ppm	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, skin, nausea, vomit.
Benzene	0.1 ppm ST 1 ppm Ca	1 ppm ST 5 ppm	**	500 ppm Ca	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, skin, nose, resp sys, nausea, headache
1,2-Dichloropropane (Propylene dichloride)	Ca - NIOSH recommends occupational exposure limited to lowest feasible concentration	75 ppm (350 mg/m^3)	**	400 ppm	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, skin, resp sys, drowsiness, light headed

Table 4.1 Selected chemicals that may be present at the Gulfco site (From NIOSH & ACGIH Pocket Guides)

Possible Chemical Contaminants	**NIOSH REL** (Recommended exposure level for 10 hr wk day/40 hr week) ST (short term exposure level/15 minutes)	**PEL** (Permissible exposure limit for 8 hr days in a 40 hr week) ST (short term exposure level/15 minutes)	**TLV** (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	**IDLH** (Immediate Dangerous to life or health concentrations	**Symptoms of Exposure** (inhalation; skin absorption)
Lindane	0.5 mg/m^3	0.5 mg/m^3	**	50 mg/m^3	Inhalation, Absorption, Ingestion, Contact: Irrit eyes, skin, nose, throat, headace, nausea, resp diff
Aldrin	0.25 mg/m^3 Ca	0.25 mg/m^3	**	25 mg/m^3 Ca	Inhalation, Absorption, Ingestion, Contact: headache, dizz, nausea, vomit
Endrin	0.1 mg/m^3	0.1 mg/m^3	**	2 mg/m^3	Inhalation, Absorption, Ingestion, Contact: headache, dizz, abdom discomfort, nausea, vomit
Dieldrin	0.25 mg/m^3 Ca	0.25 mg/m^3	**	50 mg/m^3 Ca	Inhalation, Absorption, Ingestion, Contact: headache, dizziness, nausea, vomit, sweat, limb jerks
Endosulfan I	0.1 mg/m^3	None	**	N.D.	Inhalation, Absorption, Ingestion, Contact: Irrit skin, nausea, confusion, tremor, headache
Heptachlor	0.5 mg/m^3 Ca	0.5 mg/m^3	**	35 mg/m^3 Ca	Inhalation, Absorption, Ingestion, Contact: In Animals, tremors, convulions

Table 4.1 Selected chemicals that may be present at the Gulfco site (From NIOSH & ACGIH Pocket Guides)

Possible Chemical Contaminants	**NIOSH REL** (Recommended exposure level for 10 hr wk day/40 hr week) ST (short term exposure level/15 minutes)	**PEL** (Permissible exposure limit for 8 hr days in a 40 hr week) ST (short term exposure level/15 minutes)	**TLV** (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	**IDLH** (Immediate Dangerous to life or health concentrations	**Symptoms of Exposure** (inhalation; skin absorption)
Arsenic	C 0.002 (mg/m^3) (15 minute) Ca	0.10 mg/m^3	**	5 mg/m^3	Inhalation, Absorption, Ingestion, Contact: Ulcer nasal septum, resp irrit, hyperpig of skin
Barium (as Barium chloride or Barium nitrate	0.5 mg/m^3	0.5 mg/m^3	**	50 mg/m^3	Inhalation, Ingestion, Contact: Irrit. eyes, skin, upper resp. sys. skin burns, musc. spasms, slow pulse.
Cadmium	0.005 mg/m^3 Ca	0.5 mg/m^3	**	9 mg/m^3	Inhalation, Ingestion: Pulm edema, cough, headache, chills, musc aches, nausea, vomit, diarr.
Chromium	0.5 mg/m^3	1 mg/m^3	**	250 mg/m^3	Inhalation, Ingestion, Contact: Irrit eys, skin, lung fib (histologic)
Lead	0.100 mg/m^3	0.05 mg/m^3	**	100 mg/m^3	Inhalation, Ingestion, Contact: weak, facial pallor, pal eyes, abdom pain, tremor, irrit eyes.
Selenium	0.2 mg/m^3	0.2 mg/m^3	**	1 mg/m^3	Inhalation, Ingestion, Contact: Irrit eyes, skin, nose; chills, fever, eye and skin burns.

ppm = Parts per million
Ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
C = denotes Ceiling limit
N.D. = Not Determined

Table 4.2 Chemicals of Record Used for Field Investigations

Chemical	TLV a/	(OSHA) PEL b/	Odor Threshold (ppm)	IDLH c/ (ppm)	Comments
Hexane	50	500		500	Calibration for HNU PI-101 photoionization detector. No anticipated problems since hexane in cylinder is only 0.14 percent by volume with air.
Nitric Acid	2	2		100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Hydrochloric Acid	(C),5	(C),5	1-5	100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Isopropanol	400			12,000	Decontamination fluid. Wear gloves when cleaning equipment.

ppm = Parts per million
ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
(C) = denotes Ceiling limit

Heat Stress

Field sampling activities will be conducted during the month of January. The average daily high temperature for Brazoria County for January is 64.1 degrees and the average daily low temperature is 42.5 degrees. Heat-induced illnesses are not anticipated during the Gulfco field activities. However, should such conditions exist, all field personnel shall review the Occupational Safety and Health Administration (OSHA) heat-induced illness information provided in Appendix D of this Health and Safety Plan.

If elevated temperatures occur, heat stress may result. Field work may be performed when daytime temperatures are often high. Water will be available on site, and the Site Safety Officer will encourage workers to drink frequently to prevent dehydration and stay in shaded areas whenever possible. In addition, workers should adhere to the recommended work/rest schedule determined by the Site Safety Officer. Depending on work levels and outside temperatures, each individual should monitor his body temperature and note indications of the onset of heat stress. The "buddy" system will be used at all times to check each other for the first symptoms of heat stress.

Heat stress/stroke control. The TNRCC Site Safety Officer will set work and break schedules depending on the outside temperature. General guidelines for heat stress control while sampling include rest breaks in the shade for at least 10 minutes out of every hour during elevated temperatures. Rest time shall also include fluid replacement with water or electrolytes fluids.

Heat stress/stroke monitoring. The TNRCC Site Safety Officer will monitor workers who are performing strenuous activities in elevated temperatures for heat stress/ stroke. Monitoring will be conducted at the Site Safety Officers discretion, worker's request, or at the beginning of a rest period. The monitoring shall also be conducted when workers performance or mental status significantly changes. The heat stress monitoring plan may include:

- Measurement of worker heart rate, OR
- Measurement of body temperature, and
- Observation of the field team members for signs and symptoms of heat injury.

Heart rate (HR) will be measured by the radial pulse for 30 seconds as early as possible during the resting period. The HR at the beginning of the rest period should **not exceed 100 beats per minute.** If the HR exceeds 100 beats per minute, the next work period will be shortened by one third while the length of the rest period remains the same.

Body temperature will be measured using an oral thermometer. Worker **body temperature should not exceed 99.6°F.** If the worker's body temperature exceeds this, the work period will be shortened by one third while the length of the rest period remains the same. No person will be permitted to wear a semipermeable or impermeable garment **when body temperature exceeds 100.6°F.**

Table 4.3 presents suggested frequencies for heat monitoring. Heat stress monitoring will be performed by a person with a current first-aid certification. Workers that exhibit signs of heat injury will be allowed to rest until the signs are no longer observable. The signs of heat exhaustion/stroke are discussed further in the OSHA information provide in Appendix D of this Health and Safety Plan. Suggested emergency medical procedures for treating heat exhaustion and heat stroke are also provided.

Table 4.3 - Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[1]

Temperature	Normal Work Ensemble[2]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minute work period	After each 15 minutes work period
87.5-90°F (30.8-32.2°C)	After each 60 minutes work period	After each 30 minutes work period
82.5-87.5°F (28.1-30.8°C)	After each 90 minutes work period	After each 60 minutes work period
77.5-82.5°F (25.3-28.1°C)	After each 90 minutes work period	After each 90 minutes work period
72.5-77.5°F (22.5-25.3°C)	After each 150 minutes work period	After each 120 minutes work period

[1] For moderate work, e.g. walking about with moderate lifting and pushing.
[2] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Cold Injury

Field sampling activities will be conducted during the month of January. The average daily high temperature for Brazoria County for January is 64.1 degrees and the average

daily low temperature is 42.5 degrees. OSHA provided information regarding cold-induced illness and injuries is provided in Appendix D of this Health and Safety Plan.

All field personnel should be especially alert to the possibility of cold injuries, which are most likely to occur when an unprotected individual is exposed to cold temperatures. Temperature, humidity, precipitation, and wind all play roles in the development of cold injuries. The most serious cold injuries are hypothermia and frostbite. Dehydration can also occur if insufficient fluids are not taken as in hot weather. In cold weather, the individual may not be as aware of the problem since perspiration evaporates rapidly or is absorbed by layers of heavy clothing.

Individuals with a history of cold injuries (I.e., frostbite) have a higher-than-normal risk of recurrence, not necessarily involving the part previously injured. Individuals with prior cold injuries should notify the Health and Safety Officer and use the "buddy system" to monitor early detection of cold injury symptoms.

Noise

The field team may be exposed to excessive noise levels when vehicles or industrial equipment is operating at or near the site. This condition may be encountered during the use of the direct-push sampling probe. Therefore, hearing protection will be available for use as appropriate.

Snake Hazards

The possibility exists that snakes may be encountered at the site. Long pants and high boots or snake guards will be worn during site activities to avoid a snake hazard. Never reach into a bushy area before checking for snakes by probing the area with a stick and listening for movement in the brush. Workers will use caution when working in areas where snakes may be present.

If a worker is bitten by a poisonous snake, the following steps should be taken:

- Attempt to identify the type of snake and its location,
- Keep the victim calm and minimize movement,
- Apply ice to the area bitten, and
- Transport victim to the nearest medical facility.

SAFE WORK PRACTICES

To ensure a strong safety awareness program during the sampling inspection, personnel must have adequate training. The Health and Safety Plan must be read by each member of the field team before conducting field activities and briefed to the field team at the beginning of each sampling day. A safety awareness must be developed and communicated to all members of the field team. All members of the field team will adhere to the following safety requirements while conducting field work for this sampling effort:

- No smoking, eating, or drinking carbonated beverages while at the site.
- Do not carry matches, lighters, or other ignition sources on the site.
- Facial hair will not be allowed where respirators contact the face.
- Contact lenses will not be worn during field work.
- Alcoholic beverages will not be permitted in state vehicles.
- Always use the "buddy" system while performing field work.
- Avoid walking through puddles or stained soil.
- Discovery of unusual or unexpected conditions will result in immediate evaluation and reassessment of site conditions and health and safety practices.
- A safety briefing will be performed each day prior to on-site work beginning.
- Other safety meetings may be conducted, as necessary.
- Take precautions to reduce injuries from field equipment and other tools.

All personnel will check their equipment at least two weeks before going into the field in case replacements are necessary. For respirator users, the correct corresponding cartridge or canister for the user's respirator will be verified before entering the site.

Tyvek coveralls, neoprene or nitrile gloves, hard hats, and rubber steel-toed boots or steel-toed shoes or boots will be worn by all personnel performing sampling activities. Safety glasses will be worn during sample collection to prevent to prevent eye injury from contaminated soils, sediment and/or ground water.

SECTION 5

PERSONNEL PROTECTION EQUIPMENT AND MONITORING

RESPIRATORY PROTECTION

The chemicals that may be present at the site are listed in Section 2, List of Chemicals Used On-site. Visual inspection will be used to detect the presence of any remaining chemicals which may result in respiratory hazards by noting stained or vegetation stressed areas during the initial walk through. As a final precaution, during the sample collection efforts, warning symptoms such as headaches and nausea and observations of unusual vapors, mists, or clouds, will require using readily available respiratory protective equipment or immediate evacuation of the area.

PERSONAL PROTECTION

The required personal protection clothing will be worn during on-site inspections, especially during all sampling events, except where down-grades are acceptable:

Level C (Modified)

- Coveralls (i.e., Tyvek), neoprene, PVC, or rubber boots (steel toe), inner vinyl or latex surgical gloves, outer neoprene work gloves, full-face respirator with organic and particulate filters.

- Coveralls will be taped at wrists and ankles. Respirator cartridges to be used will bear NIOSH/MSHA approvals. Respirator cartridges will be changed once daily or when recommended exposure is reached to minimize the potential for break-through. If break-through occurs, cartridges must be changed.

If a down-grade is deemed acceptable:

Level D

- Tyvek (non-chemical resistant) coveralls, neoprene, PVC, rubber, or leather work boots (steel toe), optional inner vinyl or latex surgical gloves, outer neoprene work glove, optional goggles or face masks, and a hard hat.

MEDICAL SURVEILLANCE

Each field member must be a current participant in the TNRCC Health Monitoring Program, and must have already had their initial physical examination prior to entering this or any site where a potential exists for exposure to hazardous chemicals.

Each team member will acknowledge that they have had a current annual physical by signature on the Plan Acceptance Form and that they are medically fit to perform team tasks as assigned. Any medical restrictions on a team member's utilization must be provided in writing from a physician to the Site Safety Officer prior to the beginning of field work. These restrictions will be complied with at all times while performing team tasks. If the team member cannot perform the task as required, another team member will be selected to perform the task.

SITE SPECIFIC TRAINING

The Site Safety Officer will be responsible for developing a hazard awareness briefing for all TNRCC personnel that are to perform team member tasks on the site, and other visiting personnel, as necessary. If other personnel visit the site during the sampling inspection and wish to participate, they will be required to review the Health and Safety Plan and/or receive a hazard awareness briefing from the Site Safety Officer before entering the site. This training will be acknowledged by signature of the visiting personnel on the Plan Acceptance Form (Appendix A). A daily safety meeting will be held prior to entering the site each day and a Site Safety Briefing Form completed (See Appendix B). The safety meeting will consist of the following topics:

SITE SAFETY BRIEFING (Held Each Day)

- Roll call - identify the team member responsible for site safety and health. Assure the Plan Acceptance Form has been signed by each team member.
- Assign 2-way radio Home Base (staging area) Monitor.
- Discuss safety, health, and other issues that may effect the tasks assigned.
- Discuss/review proper use of personal protective equipment.
- Review work practices by which the employee can minimize risk from hazards.
- Discuss safe operation of engineering controls and equipment used on the site.
- Review potential chemicals and acute effects of the chemicals at the site.

- Review evacuation routes, signals, and emergency evacuation procedures.
- Review decontamination procedures, assign decontamination tasks.
- Assign designated area to meet in case work area must be evacuated.
- Review "buddy" system procedures.

The Site Safety Officer shall be familiar with the operation, calibration, and limitations of all field monitoring equipment. In addition, the field team should have the following health and safety items readily available:

- Copy of the Health and Safety Plan,
- Cellular Phone & Emergency Numbers,
- 2-way communication radio set
- First aid and snake bite kits, including ice,
- Emergency eyewash bottle,
- Air sampling/monitoring equipment (PID, FID, etc,) (as required),
- Oxygen/combustible gas indicator (as required),
- Fire extinguisher, and
- Distilled water (for eyewash bottle refill and decontamination procedures).

SECTION 6

FREQUENCY AND TYPES OF AIR MONITORING

Air monitoring is not planned for the ESI sampling event at the Gulfco site. The primary contaminants of concern identified at the site through sample analysis are shown in Table 4.1. Based upon previous site operations, additional unknown contaminants may be present and all personnel must be aware of the potential for a release to the air.

However, if the Site Investigation Manager determines that air monitoring is necessary, all field activities will cease and the proper air monitoring equipment will be obtained. Air monitoring may include but not limited to: monitoring for combustible hydrocarbon emissions and for volatile organic vapors. The first instrument which may be used on site is the O_2/combustible gas indicator (CGI), or explosimeter. If used, the lower explosive limit (LEL) for combustible gases will be monitored initially before any other instruments are employed, since volatile ignitable gases may be present. Dangers from these gases include asphyxiation to entering a potentially explosive atmosphere. The **action level** for LEL is established as **>20% LEL**. Therefore, LELs of 20% or greater are cause to stop work and evacuate the area upwind until levels are determined below this action level.

If the LEL is established as < 20%, monitoring for organic vapors/gases may be conducted as the second type of air monitoring using a photoionization detector (PID) instrument. Field instruments must be calibrated prior to use at the site according to the manufacturer's specifications and as outlined in the QAPP. Monitoring of the potential breathing zone around the sampling areas will then performed during the sampling activities as well as periodically during other on-site activities. An **action level** of **10 ppm above background** will be used for **volatile organics** at all sampling areas because of the potential for encountering unknown chemicals. If 10 ppm above background is encountered on the air monitoring equipment at a sampling location, the Site Safety Officer will be immediately contacted to reevaluate safety equipment requirements or whether the site will be evacuated until the vapors are identified or dissipate.

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

Should air monitoring be required, all monitoring instruments will be calibrated daily in accordance with the QAPP. Calibration data/time/equipment comments will be noted in the project field notebook.

SECTION 7

ACCIDENT PREVENTION AND CONTINGENCY PLAN

ACCIDENT PREVENTION

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before beginning the site investigation, a meeting will be held to discuss accident prevention (see Section 5, Site Safety Briefing). The discussion should cover but not be limited to:

- Tasks to be performed; time constraints (e.g., rest breaks);
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals; and emergency medical procedures.
- Emergency evacuation procedures.

Buddy System

The "buddy" system will be used at all times by all TNRCC field personnel while performing work related tasks on site. All activities must be conducted with a partner (buddy) who can:

- Provide his or her partner with assistance;
- Observe his or her partner for signs of chemical or weather exposure; and
- Notify the Site Safety Officer or others if emergency help is needed.

CONTINGENCY PLAN

Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site, or

- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should then notify the Site Safety Officer of the chemical exposure. The Site Investigation Manager should contact the appropriate emergency response agency.

- If the chemical is on the individual's clothing, the chemical should be neutralized or removed (if it is safe to do so).

- If the chemical has contacted the skin, the skin should be washed immediately with copious amounts of water.

- In case of eye contact, the emergency eye-wash solution should be used. Eyes should be washed for at least 15 minutes using available distilled water.

- All chemical exposure incidents must be reported to the Region/Central Office Staff Safety Offices. The Site Investigation Manager is responsible for reporting the chemical exposure incident and assist the individual's supervisor in submitting a written report (see Appendix A).

Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- A team member shall signal other team members that an injury has occurred.

- A field team member trained in first aid can administer immediate treatment to the injury.

- The victim should then be transported (if applicable) to the nearest hospital or medical center, or stabilized so that further injury does not occur.

- The Site Investigation Manager is responsible for making certain that an accident report form is completed and submitted to the Region and Central Office Staff Safety Offices. Follow-up action should be taken to correct the situation that caused the accident.

Evacuation Procedures

- The Site Safety Officer will determine whether an evacuation is necessary.
- All personnel in the work area should evacuate the area and meet in the predesignated area.
- Account for all personnel. Wait for further instructions from the Site Safety Officer.

SECTION 8

SITE-SPECIFIC DECONTAMINATION PROCEDURES

Prior to leaving the site, personnel protective and sampling equipment will be decontaminated. Decontamination procedures will be conducted as follows:

- Remove and wash goggles or safety glasses (if used),
- Remove and wash chemical protective boots, gloves,
- Wash sampling equipment to remove gross contamination, and
- Wash hands and face.

Protective gloves will be placed in garbage bags and disposed of appropriately at the conclusion of site activities. Sampling equipment will be placed in plastic bags for final decontamination at the conclusion of site activities.

PERSONNEL DECONTAMINATION PROCEDURES

The TNRCC field team will establish an on-site decontamination station. An area will be set up during initial field activities prior to any sampling event. The decontamination station will have provisions for collecting disposable protective equipment; for washing boots, gloves, field instruments, sampling tools (if required); and for washing hands, face, and other exposed body parts. Investigation derived waste (IDW) from decontamination will be properly disposed in accordance with EPA guidelines outlined in the EPA/540/G-91/009, May 1991 handbook.

Decontamination equipment will include, as necessary:

- Plastic buckets, pails, and scrub brushes
- Non-phosphate detergent
- Isopropyl alcohol
- Paper towels
- Plastic garbage bags, sheets of plastic
- Deionized and potable water.

SECTION 9

DOCUMENTATION AND NOTIFICATION

LOGBOOK DOCUMENTATION REQUIREMENTS

Implementation of the provisions of the Health and Safety Plan will be recorded in the field log book. Information to be recorded shall include:

- Weather conditions at the time of the inspection (daily entry),
- Names of the personnel on-site (daily entry),
- Levels of personal protective equipment worn by the field personnel (specifically note conditions or rational for down- or up-grading PPE),
- Monitoring instrument readings,
- Subjects discussed during site health and safety briefings, and
- All safety violations.

A Health and Safety Checklist has been included in Appendix C to assist the Site Safety Officer in assuring that appropriate safety consideration have been covered in the daily safety briefing.

EPA NOTIFICATION OF IMMINENT DANGER TO THE GENERAL PUBLIC

If there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes, which are readily accessible on-site, the Site Investigation Manager will notify the Project Manager who will notify the EPA no later than one (1) day after the inspection team returns from the site. Written notification will follow any verbal communication in regard.

SECTION 10

CONFINED SPACE ENTRY

A "Confined Space" means that a space:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;
2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
3) is not designed for continuous employee occupancy.

Should confined spaces be required to be inspected for an SSI, the Site Project Manager will be responsible for evaluating the site to determine if any confined spaces meet the definition of a permit-required confined space. "Permit-required confined space" means a confined space that has one or more of the following characteristics:

1) contains or has a potential to contain a hazardous atmosphere;
2) contains material that has the potential for engulfing an entrant;
3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4) contains any other recognized serious safety or health hazard.

If permit-required confined spaces are observed on-site and are required to be investigated, the Site Project Manager, or any other team member, will not enter these spaces and will notify the Staff Health and Safety Officer, who will arrange for certified personnel who can work in permit-required confined spaces.

APPENDIX A

PLAN ACCEPTANCE FORM

SUMMARY OF ACTIVITIES

1. Initial site reconnaissance, designation of on-site ground water sample locations.

2. Collection of ground water samples using a vehicle-mounted, direct-push sampling probe.

3. Collection of off-site ground water samples using vehicle-mounted, direct-push sampling probe.

4. Collection of off-site ground water samples from an existing monitor well and an existing industrial well.

ACCEPTANCE

I have read the Health and Safety plan (or been briefed on the hazards) for Screening Site Inspection (SSI) field work to be conducted at the Gulfco site located in Brazoria County, Texas, and agree to abide by the rules and guidelines contained therein. I acknowledge that I have had a current annual physical within the last 12-month period from the date signed below, and am medically cleared to perform my tasks as outlined.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

APPENDIX B

SITE SAFETY BRIEFING

Job Number (Site) Gulfco Marine Maintenance (Gulfco) Site Number TXD055144539
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Physical Hazards _____

Control Methods _____

Chemical Hazards _____

Decontamination Procedures/Tasks _____

Evacuation Procedures/Route/Signals _____

Evacuation Meeting Area _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

****

ATTENDEES

Print Name	Sign Name

Meeting conducted by: _____

SITE SAFETY BRIEFING

Job Number (Site) Gulfco Marine Maintenace (Gulfco) Site Number TXD055144539
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Physical Hazards _____

Control Methods _____

Chemical Hazards _____

Decontamination Procedures/Tasks _____

Evacuation Procedures/Route/Signals _____

Evacuation Meeting Area _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

****

ATTENDEES

Print Name	Sign Name

Meeting conducted by: _____

SITE SAFETY BRIEFING

Job Number (Site) Gulfco Marine Maintenance (Gulfco) Site Number TXD055144539
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Physical Hazards _____

Control Methods _____

Chemical Hazards _____

Decontamination Procedures/Tasks _____

Evacuation Procedures/Route/Signals _____

Evacuation Meeting Area _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

****

ATTENDEES

Print Name	Sign Name

Meeting conducted by: _____

SITE SAFETY BRIEFING

Job Number (Site) Gulfco Marine Maintenance (Gulfco) Site Number TXD055144539
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Physical Hazards _____

Control Methods _____

Chemical Hazards _____

Decontamination Procedures/Tasks _____

Evacuation Procedures/Route/Signals _____

Evacuation Meeting Area _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

****

ATTENDEES

Print Name	Sign Name

Meeting conducted by: _____

APPENDIX C

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water.

_ 8. Emergency contact list and map to hospital (or mark in HASP).

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

_ 10. Copy of SSI Workplan.

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water.

_ 8. Emergency contact list and map to hospital (or mark in HASP).

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

_ 10. Copy of SSI Workplan.

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water.

_ 8. Emergency contact list and map to hospital (or mark in HASP).

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

_ 10. Copy of SSI Workplan.

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water.

_ 8. Emergency contact list and map to hospital (or mark in HASP).

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

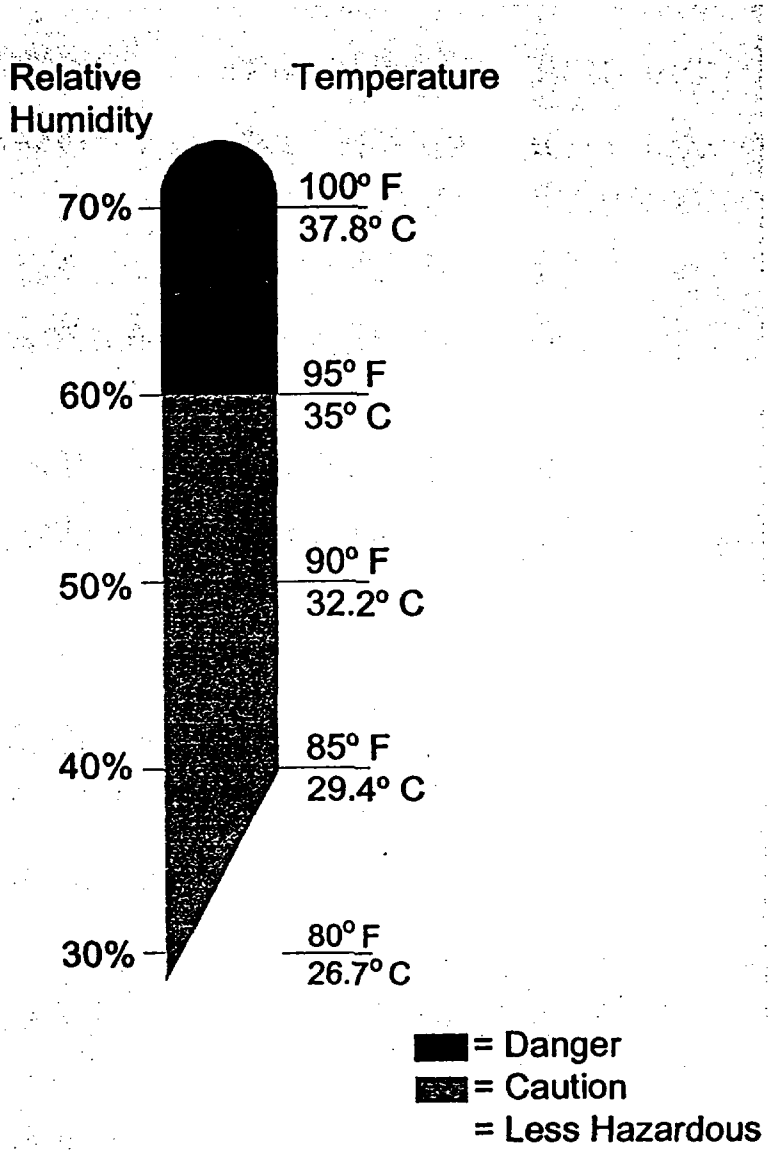
_ 10. Copy of SSI Workplan.

Appendix D

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and possible **death**.



U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3154
1998

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train the workforce about heat-induced illnesses.
- Perform the heaviest work in the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks).
- Use the buddy system (work in pairs).
- Drink plenty of cool water (one small cup every 15-20 minutes)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool shaded areas (allow your body to cool down).
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk for heat illnesses).

Workers Are at Increased Risk When

- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you when working in hot environments).
- They have had a heat-induced illness in the past.
- They wear personal protective equipment (like respirators or suits).

HEAT EXHAUSTION

What Happens to the Body:

HEADACHES, DIZZINESS/LIGHT HEADEDNESS, WEAKNESS, MOOD CHANGES (irritable, or confused/can't think straight), FEELING SICK TO YOUR STOMACH, VOMITING/THROWING UP, DECREASED and DARK COLORED URINE, FAINTING/PASSING OUT, and PALE CLAMMY SKIN.

What Should Be Done:

- Move the person to a cool shaded area to rest. Don't leave the person alone. If the person is dizzy or light headed, lay them on their back and raise their legs about 6-8 inches. If the person is sick to their stomach lay them on their side.
- Loosen and remove any heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (Ambulance or Call 911).

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE—A MEDICAL EMERGENCY

What Happens to the Body:

DRY PALE SKIN (no sweating), HOT RED SKIN (looks like a sunburn), MOOD CHANGES (irritable, confused/not making any sense), SEIZURES/FITS, and COLLAPSE/PASSED OUT (will not respond).

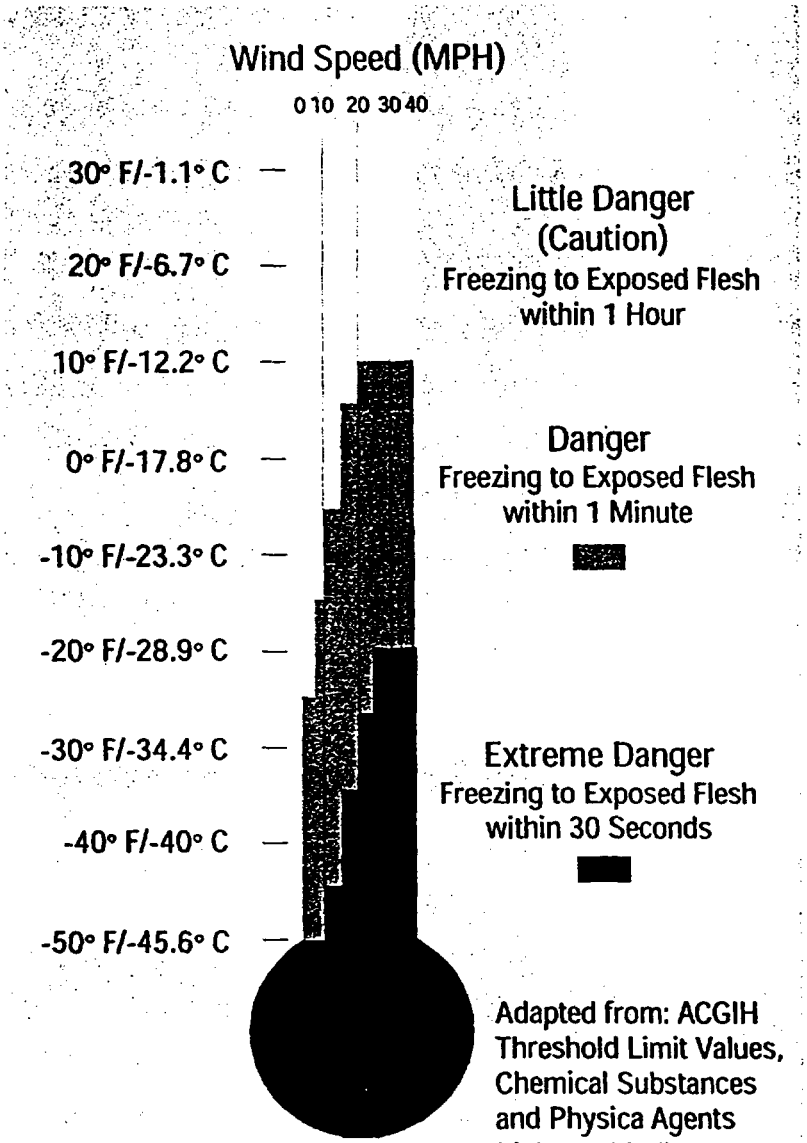
What Should Be Done:

- Call for emergency help (Ambulance or Call 911).
- Move the person to a cool shaded area. Don't leave the person alone. Lay them on their back and if the person is having seizures/fits remove any objects close to them so they won't strike against them. If the person is sick to their stomach lay them on their side.
- Remove any heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are alert enough to drink anything and not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs under the arm pits and groin area.

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/ 37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



Adapted from: ACGIH Threshold Limit Values, Chemical Substances and Physica Agents Biohazard Indices, 1998-1999.

U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3156
1998

How to Protect Workers

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train the workforce about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Take frequent short breaks in warm dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs).
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, or hot chocolate) or alcohol.
- Eat warm, high-calorie foods like hot pasta dishes.

Workers Are at Increased Risk When...

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you while working in cold environments).
- They are in poor physical condition, have a poor diet, or are older.

HYPOTHERMIA - (Medical Emergency)

What Happens to the Body:

NORMAL BODY TEMPERATURE (98.6° F/37°C) DROPS TO OR BELOW 95°F (35° C); FATIGUE OR DROWSINESS; UNCONTROLLED SHIVERING; COOL BLUISH SKIN; SLURRED SPEECH; CLUMSY MOVEMENTS; IRRITABLE, IRRATIONAL OR CONFUSED BEHAVIOR.

What Should Be Done: (land temperatures)

- Call for emergency help (i.e., Ambulance or Call 911).
- Move the person to a warm, dry area. Don't leave the person alone. Remove any wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if they are alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) or alcohol.
- Have the person move their arms and legs to create muscle heat. If they are unable to do this, place warm bottles or hot packs in the arm pits, groin, neck, and head areas. **DO NOT** rub the person's body or place them in warm water bath. This may stop their heart.

What Should Be Done: (water temperatures)

- Call for emergency help (Ambulance or Call 911). Body heat is lost up to 25 times faster in water.
- **DO NOT** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **DO NOT** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

FROST BITE

What Happens to the Body:

FREEZING IN DEEP LAYERS OF SKIN AND TISSUE; PALE, WAXY-WHITE SKIN COLOR; SKIN BECOMES HARD and NUMB; USUALLY AFFECTS THE FINGERS, HANDS, TOES, FEET, EARS, and NOSE.

What Should Be Done: (land temperatures)

- Move the person to a warm dry area. Don't leave the person alone.
- Remove any wet or tight clothing that may cut off blood flow to the affected area.
- **DO NOT** rub the affected area, because rubbing causes damage to the skin and tissue.
- **Gently** place the affected area in a warm (105°F) water bath and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast causing tissue damage. Warming takes about 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **NOTE:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

APPENDIX C

TNRCC FY2000-2001
Quality Assurance Project Plan

TNRCC

Protecting Texas by Reducing and Preventing Pollution

Quality Assurance Project Plan

for

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site Inspection Program

(FY 2000-2001)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

October 1999

Quality Assurance Project Plan

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site Inspection
Program (FY 2000-2001)

Prepared in cooperation with the

U.S. Environmental Protection Agency

October 1999

The preparation of this report was financed through a grant from the U.S. Environmental Protection Agency.

QTRACK # TQ-99-012

QUALITY ASSURANCE PROJECT PLAN
FOR
TNRCC PRELIMINARY ASSESSMENT AND SCREENING SITE INSPECTION PROGRAM

TNRCC Concurrence:

Stephanie Pogue
Stephanie Pogue
Superfund Site Discovery and Assessment Program
Quality Assurance Officer
10-7-99
Date

Allan M. Seils
Allan M. Seils
Superfund Site Discovery and Assessment Program
Program Manager
10/12/99
Date

Wesley G. Newberry
Wesley G. Newberry
Superfund Site Discovery and Assessment Program
Technical Director
10/12/99
Date

David L. Davis
David L. Davis
Texas Natural Resource Conservation Commission
Remediation Division
Assistant Division Director
10/12/99
Date

EPA Approval for Implementation:

William M. Rhetonberry
William M. Rhetonberry
U.S. Environmental Protection Agency, Region 6
Site Assessment Manager for Texas
10/26/99
Date

Susan Wooster
Susan Wooster
U.S. Environmental Protection Agency, Region 6
Site Assessment Team
10/26/99
Date

TABLE OF CONTENTS

TABLE OF CONTENTS - **Continued**

FIGURES

TABLES

APPENDICES

Appendix A - Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule

Appendix B - Sampler's Guide to the Contract Laboratory Program

Appendix C - Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund Quick Reference Fact Sheet, August 1999

Appendix D - Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund Quick Reference Fact Sheet, August 1999

Appendix E - Low Concentration Organic Analytical Service for Superfund (Water Matrix) Quick Reference Fact Sheet, August 1999

REFERENCES

Interim Draft EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, May 1994

EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Document No. ILM04.0

USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Revision No. OLM03.1, August, 1994

USEPA National Functional Guidelines for Inorganic Data Review, EPA 540/R-94/013, February 1994.

USEPA National Functional Guidelines for Organic Data Review, EPA 540/R-94/012, February 1994.

QAPP DISTRIBUTION LIST

Name	Organization
William M. Rhotenberry Site Assessment Manager	U.S. Environmental Protection Agency, Region 6 Site Assessment Team
Wesley G. Newberry, Technical Director	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Allan M. Seils, Program Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Stephanie Pogue, QA Officer	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Kelly Cook, Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Marshall Cedilote, Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Vacant Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Johnny Kennedy Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program Region 12 (Houston) Office
J.D. Thompson, Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program Region 4 (Arlington) Office
Gary Hazelwood, Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program Region 5 (Tyler) Office
Judie Mattocks Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Melissa Cordell Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
John Syer Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program
Susy Loftus Site Investigation Manager	TNRCC, Remediation Division Superfund Site Discovery and Assessment Program

SECTION A

PROJECT MANAGEMENT

(A4) PROJECT ORGANIZATION and (A6) PROJECT DESCRIPTION

This document is a Quality Assurance Project Plan (QAPP) for the planning and implementation by the Texas Natural Resource Conservation Commission (TNRCC) of the Preliminary Assessments (PA) and Site Inspections (SI) in Texas for the U.S. Environmental Protection Agency (EPA) Superfund program. This QAPP has been prepared in accordance with the "External Review Draft Final EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations", EPA QA/R-5, October 1998; "EPA Guidance for Quality Assurance Project Plans", EPA QA/G-5, February 1998; "Guidance for the Data Quality Objectives Process", EPA QA/G-4, Final - EPA/600/R-96/055, September 1994. The site assessment process begins with site discovery, or notification to EPA or the TNRCC of possible releases of hazardous substances. The sites are evaluated using a phased investigation consisting of the PA and, if necessary, the SI. The PA is a limited scope investigation based primarily on available information. Samples are not collected during a PA. The PA distinguishes sites that pose no threat to human health and the environment from sites that may pose a significant threat. Sites that may pose a threat receive a further action recommendation after the PA and undergo an SI, where investigators collect sufficient waste and environmental media samples to identify sites that have a high probability of qualifying for the National Priorities List (NPL). This QAPP serves as a controlling mechanism to ensure that all data collected are of satisfactory quality.

A Regional EPA site assessment representative may accompany TNRCC personnel on the PA site visit and based solely on the field findings an immediate decision will be made on whether to proceed with preparation of an Screening Site Inspections (SSI) Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage. The TNRCC Site Investigation Managers will be responsible for collecting the samples defined in the SSI or Expanded Site Investigation (ESI) Work Plan (WP), initiating the proper chain-of-custody, health and safety, and quality assurance procedures. The TNRCC Site Investigation Managers will also be responsible for making any field sampling determinations as dictated by site conditions. Samples from the sites will be analyzed for semivolatiles, volatiles, metals, cyanide, pesticides and Polychlorinated Biphenyls (PCBs) and, if required, dioxins/furans.

If, considering site conditions, there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes which are readily accessible on-site, the EPA will be notified no later than one (1) day after the inspection team returns from the site visit. Written notification will follow any verbal communication in this regard. The EPA will determine the course of action.

The Preliminary Assessments and Site Investigation (PA/SI) program organization chart, Figure 1.1, identifies the key individuals who will be primarily responsible for performance of the project. This organizational structure forms a management team of professionals to oversee the technical aspects of the project, supported by an administrative team who will ensure that personnel and equipment are available to the project when required.

Allan M. Seils, will function as TNRCC Program Manager. Mr. Seils will be responsible for overall coordination of project activities. He also will serve as primary TNRCC contact for the EPA. The Technical Director, Wesley G. Newberry, will review the SSI work plans, Preliminary Assessment (PA) and SSI reports, and progress reports. The Quality Assurance Specialist will be responsible for reviewing data in accordance with the procedures outlined in this QAPP, and will complete associated data assessment reports. The Quality Assurance Specialist will function independently of the Program Manager and will assure that project quality control is maintained. The Quality Assurance Specialist will audit the field work at 20% of the SSI/ESI sites. The Health and Safety Officer, will function independently of the Program Manager. As such, he, or his designee will be responsible for ensuring that all on-site activities comply with the approved site specific Health and Safety Plan.

A generic Health and Safety Plan (H&SP) will be followed during performance of each PA site visit. Individual site H&SPs will be prepared for all SSI sites as part of the work plan development. All H&SPs will be based on TNRCC's health and safety program and TNRCC's understanding of current health and safety regulations.

During Fiscal Years 2000 and 2001, the TNRCC will complete twenty-four (24) Preliminary Assessments (PAs), including early Potentially Responsible Party (PRP) searches, and twenty-eight (28) Screening Site Inspections (SSIs) in Texas in accordance with the Cooperative Agreement (CA) with the U.S. Environmental Protection Agency (EPA). A minimum of two (2) persons per PA and four (4) persons per SSI/ESI will be used to conduct field activities. At these sites, one TNRCC staff person will be designated as the lead Site Investigation Manager and will have the on-site responsibility for ensuring that the HS&P and QAPP are followed, and that appropriate data are collected to allow for preparation of site-specific SSI/ESI WP. The Site Investigation Manager also will be responsible for planning and conducting the site visit and preparing the final PA, SSI report including PREScore calculations and/or Documentation Record for the site.

Figure 1.1 Preliminary Assessments and Site Investigation Program Organization Chart

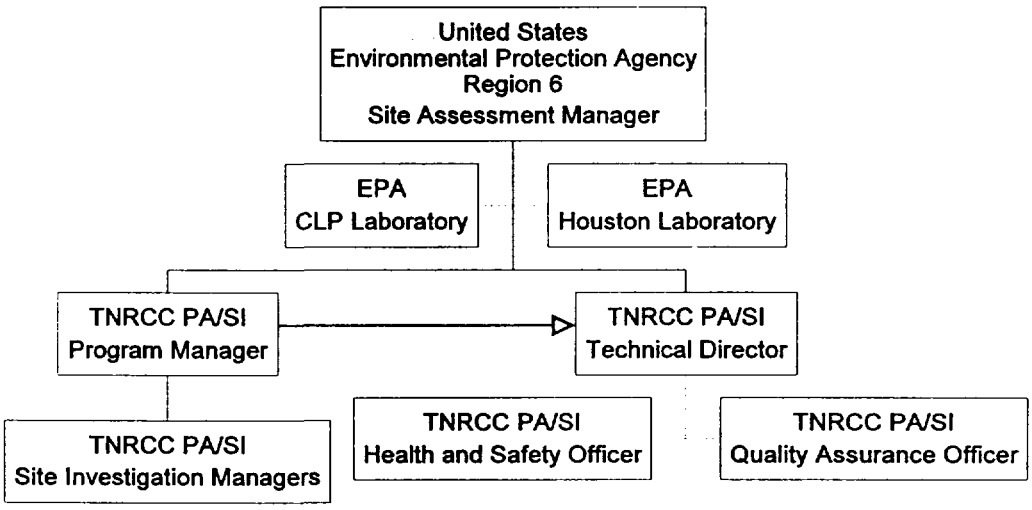


Table 1.2 Schedule of Preliminary Assessments

PA Activity Schedule	Technical Work Hours After Site Assignment
Site Assignment to TNRCC	0
PA Background Research	60
PA Site Reconnaissance	12
Draft PA Report Complete	38
Final PA Report Complete	10
Total Hours:	120

Table 1.3 Schedule of Site Inspections

SSI Activity Schedule	Technical Work Hours After Site Assignment
Site Assignment to TNRCC	0
SSI Background Research	60
Prepare SSI Work Plan	70
Prepare Health & Safety Plan	40
Execute SSI Work Plan (includes acquiring site access)	137
Validate Data	40
Draft PRESCORE Calculation	11
Draft SSI Report Complete	125
Final PRESCORE Report	1
Final SSI Report Complete	16
Total Hours:	500

It is anticipated the TNRCC Program Manager will issue site assignments such that the majority of PAs are completed within the first six (6) months of the fiscal year. See Appendix A - Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule. This will allow those sites which progress directly to an SSI Work Plan to be completed within the final six months of the fiscal year. The total anticipated time to complete each PA is 120 hours and each SSI is 500 hours. A detailed schedule for the completion of PAs and SSIs is presented in Tables 1.2 and 1.3, respectively. In the event an expanded SSI (ESI) is warranted, the total anticipated time to complete the ESI is 600 hours from site assignment. If the site is to be proposed for the NPL, a Hazard Ranking System (HRS) package may be warranted, and the total anticipated time to complete the HRS is 700 hours from completion of the ESI. These schedules may be adjusted to meet specific requirements of the EPA guidance. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA)" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; 6) "Management of Investigation-Derived Wastes During Site Inspections", May, 1991; and 7) Sampler's Guide to the Contract Laboratory Program, 1996.

The TNRCC Site Investigation Manager designated to lead investigations at the SSI/ESI site will develop a WP and sampling strategy for the site. The information gained from the PA, tentative disposition, and other timely information will be used in determining tentative numbers, nature, and location of samples collected. The WP consists of (1) a list of project contacts; (2) data quality objectives, and a site background review including site history, descriptions of the site including geology, hydrology, soil conditions, site map(s), and waste handling practices including types and quantities of wastes generated (if known); (3) a WP summary including field personnel, site reconnaissance plan, sampling strategy, sampling locations and map(s), and QA/QC sample protocols and decontamination procedures. The WP will also identify potential targets for the groundwater, surface water, soil exposure, and air pathways; (4) a health and safety plan to describe potential hazards and necessary site specific precautions and preparations for completing the field work described in the sampling plan; and (5) general project requirements such as a schedule, equipment needed, and mobilization/demobilization procedures.

The TNRCC Site Investigation Managers will prepare the WP according to the format agreed to by the EPA for use on the FY2000 and 2001 Multi-Site PA/SI Scope of Work. Revisions to this format will be determined by the EPA and TNRCC project managers prior to preparing the first documents. The EPA will be responsible for approving each work plan; however, the

decision to proceed with WP implementation may be delegated by the EPA Site Assessment Manager (SAM) to the TNRCC Program Manager, as appropriate.

EPA shall choose a laboratory to be used for this project under its Contract Laboratories Program (CLP) and shall incur all costs for sample analyses. A CLP laboratory or the EPA Houston's Laboratory shall provide analytical support for drinking water samples. The sample analyses shall include analysis for all constituents listed on the CLP Routine Analytical Services (RAS) Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL).

(A5) PROJECT DEFINITION/BACKGROUND

The major objective of this project is to perform and complete Preliminary Assessments and Screening Site Inspections at sites judged to be potentially hazardous because of current and past operational and waste disposal activities. The PA and SSI reports will provide technical information and data that can be used to determine the score of each respective site according to the Hazard Ranking System (HRS). The HRS is the primary means by which EPA evaluates sites for Superfund's National Priorities List (NPL).

Preliminary Assessments (PA) and Screening Site Inspections (SSI) will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS), Final Rule, dated December 14, 1990. The EPA furnished guidance for performance of these tasks and it will be used as reference material in collecting data, planning, and conducting on-site activities, and in preparation of the reports for each site. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under CERCLA" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; 6) "Management of Investigation-Derived Wastes During Site Inspections", May, 1991; and 7) Sampler's Guide to the Contract Laboratory Program, 1996.

Initial preparations for each PA, SSI and ESI site visit will involve obtaining information for preparation of the Health and Safety Plan and SSI/ESI WP. This task also includes obtaining access to the sites and the site inspection visit. Prior to any on-site inspections, the project staff and the TNRCC Program Manager will review the results of the preliminary assessment and/or available EPA and/or TNRCC files to address any health and safety risk concerns, and to assess the level of effort necessary to perform the site visit.

The TNRCC project staff will conduct a detailed background study for each PA/SSI/ESI site prior to any field activities. The purpose of this study is to collect available file information concerning activities at the site, hydrogeologic, photographic and topographic in formation pertinent to the site (to be used in pathway evaluation), and population and ecological information available for the area surrounding the site (to be used in a target evaluation).

Site activities information to be collected during this background study will be primarily the EPA, TNRCC, and other State and Federal agency records on the site. Hydrogeologic and topographic information will be collected at this time primarily from USGS topographic maps, city and county maps, county and regional water reports, county and regional geologic cross sections, state well construction records, soil maps, etc. Population and ecological information will be collected primarily from census figures, USGS topographic maps, public school records, the Texas Manufacturers Index, U.S. Fish and Wildlife and Texas Parks and Wildlife endangered species publications, and additional information if available. Aerial photography, as available from the Texas Natural Resources Information System, Texas Department of Transportation, and other sources, will also be examined for additional information about the site.

The data collected will, whenever possible, be selected to meet the requirements of the HRS model. It is understood that, at the level of effort appropriate for a PA, it may not be possible at some sites to collect "HRS quality" data to fulfill every requirement of the model. The TNRCC will make every reasonable effort to collect "HRS quality" data for every site, within the limits of the project schedule, budget, and the available information. Every effort will be made to collect the best available information during the performance of each PA. In addition, all SSI/ESI information will be collected in accordance with applicable SI guidance.

The level of effort required for the SSI background research may be greater than that normally required. This increased effort is necessary because the PAs for some of the sites may not have been prepared prior to publication of the current HRS guidance and do not contain complete HRS information. Therefore, this additional PA information may need to be collected during the background study task of the SSI/ESI.

In most cases, it will be necessary to obtain advance permission to inspect the sites. The TNRCC will obtain access agreements for each site. The designated TNRCC Site Investigation Manager for each site will prepare a written notification to the site owner/operator of the impending site visit, followed by telephone confirmation by the TNRCC Site Investigation Manager. The TNRCC Site Investigation Manager will also be responsible for notifying the local TNRCC Regional Office of the impending site visit. The TNRCC Program Manager will provide each member of the TNRCC project staff with written credentials describing the nature of the project and the authority under which it is conducted.

Upon arrival at a site, the inspection team will conduct an initial survey of the site to ensure adequate safety precautions are in place during site activities. The Site Investigation Manager will, when possible, conduct a detailed interview with site representatives. Where operator records are present, these will be reviewed for an indication of the type and quantity of materials disposed of at a given site. Where possible, the party responsible for waste disposal will be determined. Interviews with other individuals familiar with the site will be conducted as appropriate before, during, or after on-site reconnaissance activities.

In addition, a thorough site reconnaissance, if possible, will be conducted at each site. The inspection team will visually survey and document the location of the site relative to any roads or other access, drainage systems, surface waters, nearby structures, drums, tanks, monitoring wells, facility boundaries, unique geological features, and other factors which may affect pollutant migration pathways. These factors will be recorded, to the extent practical, on a field site sketch which will be prepared during the site visit. The facility sketch also will document the location of sensitive environmental receptors such as on-site and off-site homes and public building, natural areas, and drinking water supplies. Residences within 400 yards of the site will be included in the site sketch. Indicators of existing problems, such as areas of diseased, dying, or distressed vegetation or discolored soil, also will be noted on the site sketch. Photographs will be taken as necessary to document observations and on-site activities. Generalized population information, including collection of environmental equality data, will be based on the number and types of surrounding homes and businesses.

For each PA, initial activities will involve the collection of site background information and completion of a site visit. A Regional EPA site assessment representative may accompany TNRCC personal on the PA site visit and based solely on the field findings an immediate decision will be made on whether to proceed with preparation of an SSI Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage.

If a site is designated to proceed to the SSI phase, then an SSI Work Plan and final SSI Report will be prepared for submission to the EPA. A complete PA will not be prepared for these sites. An abbreviated PA Report will be prepared for those PA candidate sites which are determined ineligible for CERCLA response by the EPA site assessment representative.

For SSI/ESI visits, environmental samples will be collected in accordance with the approved WP to provide site-specific data on the hazardous substances present as well as pollutant dispersal pathways. The samples collected during the SSIs and ESIs typically will be from the following sources:

- o On-site and off-site soils;
- o Groundwater from existing potable or agricultural water or monitoring wells;
- o Water or waste from open drums, surface impoundments, or evaporation pits;
- o Point of entry into receiving waters in the runoff pathway(s) from the site;
- o Environmentally sensitive areas near the site.

For each SSI, field activities will be conducted in two steps. TNRCC will collect information needed to prepare a work plan before the site visit. Following approval of the work plan, TNRCC will visit the site to execute the work plan, including sampling activities. The collected information, including sample results, will be compiled into a final SSI Report for the site.

(A7) DQO for MEASUREMENT DATA

A quality assurance (QA) program is essential to assure the quality, controllability, accountability, and traceability of the work being performed for the TNRCC PA/SI Program. Quality assurance encompasses all actions taken by TNRCC and its subcontractors to achieve results which are accurate, reliable, and legally defensible for all aspects of the project. TNRCC and its subcontractors will adhere to the quality assurance procedures outlined herein and will rigorously implement the QA program throughout the duration of the project.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to score and to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with preset standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly if necessary without causing undue expense or delay to the project. The standards and review procedures which TNRCC will use to attain optimum accuracy and completeness of data are outlined in this plan. All subcontractors to TNRCC will be required to follow these standards and procedures, at a minimum.

The quality assurance objectives for all measurement data include considerations of precision, accuracy, completeness, representativeness, and comparability. Compliance with the QA objectives will be judged individually for each site. QC objectives stated in the EPA CLP Statements Of Work (SOW):

CLP analytical services are defined in Statements of Work (SOWs). The following SOWs provide the technical and contractual framework for commercial environmental testing laboratories to apply EPA CLP analytical methods for the preparation/isolation, detection, and quantitative measurement of organic target compounds and inorganic target analytes in water and soil/sediment environmental samples.

Each SOW includes a summary of general requirements; reporting and deliverable requirements; target compound or target analyte list and contract required quantitation/detection limits; specific analytical methods; quality assurance/quality control requirements; chain-of-custody and sample documentation requirements; a glossary of terms; and specifications for reporting data in computer-readable format, when applicable.

1. USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, OLM03.0 (Revisions OLM03.1 and OLM03.2)

This document defines the analytical methods accepted by the CLP for the isolation, detection, and quantitative measurement of 33 volatile, 64 semivolatile, and 28 pesticide/Aroclor target compounds in water and soil/sediment environmental samples.

2. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, ILM04.0

This document defines the analytical methods accepted by the CLP for the preparation, detection, and quantitation of 23 inorganic target analytes and cyanide in water and soil/sediment environmental samples.

3. USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Low Concentration Water, OLC02.1

This document defines the analytical methods accepted by the CLP for the isolation, detection, and quantitative measurement of 41 volatile, 59 semivolatile, and 28 pesticide/Aroclor target compounds in low concentration groundwater and drinking water type samples.

PRECISION

The precision of a measurement is an expression of mutual agreement of multiple measurement values of the same property conducted under prescribed similar conditions. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same exact sample under the same conditions or a matrix spike and matrix spike duplicate. It is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internally (laboratory duplicates) and externally (field duplicates) to the laboratory. Laboratory duplicate control limits for organics are method and laboratory specific, and will be evaluated as part of the EPA-CLP data validation. For metals analysis, a control limit of 20 percent RPD will be used for matrix spike and matrix spike duplicate sample values greater than or equal to 5 times the contract required detection limit. For field duplicates, a RPD of $\pm 50\%$ percent will be used as the objective of precision.

Field measurements may be taken of pH, conductivity, temperature, water level, and organic vapor concentration based on systems photo ionization detector (HNU) or organic vapor analyzer (OVA) readings. The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. For the pH meter, precision will be tested by multiple readings in the medium concerned. The readings will be within 0.1 pH standard units after the instrument has been field calibrated with standard buffer solutions.

The water level indicator readings will be precise within 0.1 foot for duplicate measurements. The HNU or OVA will be calibrated each day prior to field use. If calibration readings deviate 15 percent or more from the concentration of the calibration gas, the instrument will be recalibrated.

ACCURACY

The degree of accuracy of a measurement is based on a comparison of the measured value with the actual true value. Accuracy of an analytical procedure is best determined based on the recoveries of matrix spike, matrix spike duplicate, and surrogate compounds.

The degree of accuracy and the recovery of analyte to be expected for the analyses of QC samples and spiked samples is dependent on the matrix, method of analysis, and the compound or element being determined. The concentration of the analyte relative to the method detection limit is also a major factor in determining the accuracy of the measurement. For metals analysis, spike recovery limits of 75-125 percent will be used. The QC acceptance ranges and limits for GC/MS organic analyses used to assess the accuracy of the data according to CLP protocol stated in stated in the EPA CLP Statements Of Work. These QC acceptance ranges and limits will be used as part of the EPA-CLP data validation.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment. The pH meter is calibrated with standard buffer solutions. The HNU or OVA will be calibrated daily with calibration gas.

REPRESENTATIVENESS

Samples taken must be representative of the population. Because uncontrolled hazardous waste sites vary greatly in size and complexity, specific SI sampling guidelines that apply to all sites are not possible. Site-specific sampling plans are located in the workplan developed for each site.

COMPARABILITY

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with previous and future studies. Concentrations will be reported in a manner consistent with general practices. Standard EPA analytical methods and quality control will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with EPA or manufacturer's specifications and will be checked with the frequency specified in the EPA CLP Statements Of Work.

COMPLETENESS

The completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The EPA-CLP data validation will determine the amount of valid data obtained from each site inspection. At the end of each SSI, completeness of data will be assessed and, if any data omissions are apparent, an attempt will be made to re-sample the parameters in question. The specific objective for the completeness of this project will be greater than or equal to 90 percent for field and laboratory data for each site.

ANALYTICAL PARAMETERS AND QUANTITATION LIMITS

The analytical parameters and their quantitation limits for use on this project are determined under the EPA's Contract Laboratories Program (CLP). All samples will be analyzed by CLP methods. Quantitation limits are determined by the Contract Required Quantitation Limit (CRQL) and the Contract Required Detection Limit (CRDL) which is the minimum level of detection acceptable. See Appendices C, D, E.

HOLDING TIMES

Holding times specified by EPA protocols will be set for samples collected under this program. See Appendix B, p. 14.

(A9) TRAINING

A large percentage of TNRCC Site Investigation Managers have prior experience in conducting site investigations; however, all inspectors will undergo a formal training program. Major areas covered during the formal training project will be the objectives of the PA and SSI, preparation for inspection, legal ramifications, health and safety considerations, use of monitoring and sampling equipment in the field, sample shipment and chain-of-custody

procedures, the appropriate procedures to be followed relative to any denial-of-entry problems encountered, and other aspects of the work to be performed under this project.

Each TNRCC employee involved in sample collection will be trained on how to collect representative samples from every medium which might be encountered. Project personnel will receive additional training in proper field documentation and in health and safety procedures. All training will be documented, and records will be maintained by the Program Manager.

(A10) DOCUMENTATION and RECORDS

Documentation Records will include documentation for all HRS factors evaluated. All assertions of fact will be referenced in the record. All reports will be submitted to the EPA as they are completed. Any corrections or additions to the submitted material that the EPA deems necessary and appropriate will be made by the TNRCC within budget constraints. A PA, SSI/ESI WP, SSI Report, and Documentation Record will be deemed complete and final when the EPA approval is received, or within six (6) months of submittal, whichever comes first.

Following the site visits and completion of analytical work, the TNRCC will prepare a PA or a PA (Abbreviated) and/or SSI report or Documentation Record (for ESI sites only) highlighting significant findings for each site. The abbreviated PA Reports will be prepared in accordance with the requirements stated in the "Guidance for Performing Preliminary Assessments Under CERCLA", September 1991, Section 4.4 Abbreviated Reporting. The final SSI reports will be prepared in accordance with the report outlines approved by the EPA. Documentation Records will be prepared in accordance with current guidance and by using the companion WordPerfect® version of the Documentation Record. Should additional guidance become available prior to completion of this project, the TNRCC will evaluate the effect that conformance to this guidance will have on the schedule and budget, and will submit a revised schedule and budget to the EPA for approval.

The SSI reports will contain a description of the site, the operating history and nature of waste handling at the site, and a discussion of waste sources, pathway characteristics, and identification and description of potential human and environmental targets. In addition, the SSI report will contain a description of the data collected, analytical results, and QA/QC data. Supporting documents will be included in the SSI report as appendices and will consist of stratigraphic, hydrogeologic, and topographic information; a site sketch and other pertinent maps; laboratory and chain-of-custody report originals; photographs; field notes; and reports from previous investigations at the site. All data collected during each SSI/ESI visit will be validated using the most current EPA data validation guidelines and any EPA Regional instructions.

QUALITY ASSURANCE REPORT

A summary of all QA activities and findings during the course of this project will be reported to the EPA on a site specific basis with the final site inspection reports. Other project-related quality assurance items and corrective actions will be discussed in the monthly progress reports. These may include the following items:

1. Summary of QA management, including any changes;
2. Measures of data quality from the project;
3. Significant problems related to work quality, and the status of any corrective actions implemented;
4. Results of QA performance audits;
5. Results of QA systems audits;
6. Assessment of data quality in terms of precision, accuracy, completeness, representativeness, and comparability; and
7. Quality-assurance-related training.

RECORD KEEPING

All information pertinent to PA site visits and SSI sampling activities will be recorded in a logbook. This book will be bound and have consecutively numbered pages. Entries in the logbook will be made in ink and will include, at a minimum, a description of all activities, the names of all individuals involved (sampling and oversight), date and time of sampling, weather conditions, any problems, and all field measurements.

SECTION B

MEASUREMENT/DATA ACQUISITION

(B1) SAMPLING PROCESS DESIGN

After approval of the SSI work plan, the field activities will be executed. At each site, these activities may include soil sampling, sediment sampling, surface water sampling, and groundwater sampling.

Detailed reports on all PA and SSI non-sampling data collection and SSI sampling activities will be kept in field logbooks. In this book will be noted the date, time, location, and identification of each sample, along with the collector's name, a description of all equipment used and any problems encountered, and general comments of the inspection team. Logbooks also are used to record pertinent information regarding the site itself, including date, time, location, and identification of all photographs taken during the site visit.

Proper identification and labeling of samples is crucial to an effective sampling program. Immediately upon collection, each sample must be sealed and tagged. The tag should be marked with a sample identification number, station location, type (composite or grab), concentration (low, medium, or high), the parameters requested, collector's name, and the date and time of sample collection.

For many of the SSIs, the determining factor of hazard evaluation will be the data provided by sampling and analytical activities. Thus, it is important that QA/QC be maintained for each sample. The purpose of this Section is to outline specific procedures for inspectors to use while acquiring and handling samples during an inspection to ensure that quality data are obtained.

Certified clean sample bottles will be used for sample collection. Custody of these bottles will be maintained by documenting the batch number of the sealed box, documenting opening of the box, and keeping the bottles locked up at all times. If returned to the office, the bottles will be placed in a sealable container and secured with custody seals.

(B2) SAMPLE METHODS REQUIREMENTS

This Section discusses the standard sampling procedures. Other sampling procedures may be used as determined necessary by the lead Site Investigation Manager and with approval of the Technical Director or Program Manager.

Regardless of sample type, the following principles and procedures should be adhered to during the sample collection phase of a site inspection:

1. Obtain ice before visiting a site where sample collection is involved.

2. Add appropriate preservatives to the sample bottles at the time of sample collection. See Appendix B, p. 14. The bottles required for each analysis are shown in Appendix B, p. 9-10.

3. If there is reason to suspect the presence of toxic vapors, precede sampling activities by an initial survey of suspect areas, using appropriate safety gear and a photoionization detector (or equivalent). The potential use of air monitoring equipment should have been specified in the SSI Work Plan. If it was not, and if organic vapor presence is possible, contact the Program Manager and Project Safety Officer for possible changes in safety procedures.

4. If possible, collect background samples first, then proceed from the probable least contaminated to most contaminated sampling points.

5. Change disposable gloves between sampling points, placing used gloves in a plastic bag for disposal.

6. If it is necessary to reuse sampling devices, use the specified decontamination procedures between sampling points.

7. At each sampling location,
   a. Photograph the collection of samples.
   b. Record in the logbook:
   - Sample number;
   - Photo number;
   - Location (show on site sketch);
   - Type of sample;
   - Date and Time; and
   - Relevant observations.

8. If a facility representative requests, they will be allowed the opportunity to collect split samples. If these are desired, place samples directly in different containers at the sampling point rather than splitting them at a later time. In the event there may not be enough soil, sediment, and/or groundwater volume to provide split samples, collect the SSI required sample first and than provide the remaining volume to the facility representative.

9. Before placing samples in the iced cooler:

   a. Complete the sample tags and labels, and place clear tape over the sample labels on the sample containers to protect the writing from moisture.

   b. Check the pH of all preserved water samples (exclusive of VOA samples).

   c. Place a custody seal around the bottle cap.

   d. Wrap the sample containers with plastic foam, bubble pack, or equivalent to protect against breakage.

   e. The TNRCC will include in each ice chest with samples to be shipped for analysis, a temperature blank taped to the side of the chest prior to shipping.

   f. Place the sample containers in plastic Ziploc® bags or equivalent to prevent melted ice from contacting the container.

   g. Place wrapped sample containers into ice chests filled with 2 to 3 inches of vermiculite.

10. Remove water from melted ice frequently, and replace with fresh ice. Place ice in plastic Ziploc® or sealable bags to minimize water leakage during shipment.

GROUNDWATER WELL SAMPLING PROCEDURES

General

The primary consideration is to obtain a representative sample of the groundwater zone of interest without mixing the sample with stagnant (standing) water in the well casing.

To safeguard against collecting nonrepresentative stagnant water in a sample, the following guidelines and techniques will be adhered to during sample withdrawal:

1. As a general rule, all monitoring wells shall be pumped or bailed a minimum of three volumes of water in the well casing with three (3) consecutive consistent readings within 10% RPD for conductivity, ± 1°C for temperature, and within ± 0.5 pH units before representative samples are withdrawn.

2. For wells that can be pumped or bailed to dryness with the sampling equipment, the well should be evacuated and allowed to recover to 85 percent of original water level before sample withdrawal. In the event the well has not recovered to 85 percent after 24 hours, a sample may be drawn from the well. Enter the well volume recovered into the field logbook.

3. The purge waters will be managed according to guidance provided in the "Management of Investigation-Derived Wastes During Site Inspections", May 1991. The preference is to leave both RCRA hazardous and non-hazardous investigation-derived wastes on-site whenever it complies with regulations and does not pose any immediate threat to human health and the environment.

Sampling, Monitoring, and Evacuation Equipment

Sample containers will conform to EPA regulations for the appropriate constituents.

The following equipment should be on hand when sampling wells:

1. Coolers for sample shipping and cooling, chemical preservatives, and appropriate packing materials.

2. Camera and film, labels, appropriate keys (for locked wells), tape measure, water level indicators, and pH/temperature/specific-conductivity meter.

3. Pumps. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps.

4. Bailers and monofilament line with tripod-pulley assembly (if necessary).

5. Decontamination solutions--tap water, distilled water, Alconox, isopropanol, CLP specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical to manufacture, easily cleaned, and reused, able to operate at remote sites in the absence of power resources, and capable of delivery variable rates for well flushing and sample collection.

Calculation of Well Volume

Calculations are to be made according to the following steps:

1. Obtain all available information on well construction (casing, screens, etc.).

2. Determine well or casing diameter.

3. Determine static water level (feet below top of casing).

4. Determine depth of well from top of casing.

5. Calculate number of linear feet of static water (total depth minus the static water level).

6. Calculate one well volume in gallons: $V = Tr^2 (0.163)$, where T is linear feet of static water, and r is the inside radius of the well of casing in inches.

7. Determine the well volumes in gallons to be evacuated before sampling.

If possible, a number of observations will be made when groundwater sampling is to take place. Some of the information can be gained from file review prior to a site inspection.

1. Note if monitoring wells are locked. Arrangements must be made to secure keys or to remove locks by other means and re-secure the wells.

2. Note the condition of the monitoring wells (i.e. casing, concrete pad, etc.).

3. Note well diameters to ensure that a pump and/or bailer of the proper size will be available. The diameter is also necessary for calculating the wells' static water volume.

4. Note the type of casing materials--PVC, steel, etc.

5. Note any observable physical characteristics of the groundwater as it is being sampled--color, odor, turbidity, etc.

6. Measure the static water level of each well before sampling, if possible. This is best accomplished with an electronic water level indicator. Similarly, determine the total depth of the well before sampling. Obtain these measurements whether or not well logs are available, since the measurements are required in calculating the static water volume of the well.

7. Measure the pH, temperature, and specific conductivity of the groundwater being sampled. To avoid possible contamination problems, measure temperature, pH, and specific conductivity on a portion of groundwater which is not in a sample container to be sent out for analysis.

SURFACE WATER SAMPLING PROCEDURES

Surface water sampling locations will be selected according to the probability that they will show contaminants migrating from a site. In general, samples will be taken from streams running through or adjacent to a site, including those bodies of water which may receive surface runoff or leachate from a site. Samples will only be collected where it can be shown that the site provides the only source of contaminants to the surface water body. Care will be taken in sampling leachate breakouts, which may have high concentrations of contaminants. Surface water will also be sampled from any adjacent standing bodies of water such as ponds, lakes, or swamps which might be receiving contaminants.

Grab samples will be collected using a pond sampler. The pond sampler, described in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA 1980 (EPA-600/2-80-018), consists of a beaker attached with a clamp to a telescoping aluminum pole. This sampler allows a sample to be collected several feet from the bank or berm.

TAP WATER SAMPLING PROCEDURES

Well depth, casing size, and holding-tank volume will be obtained, if possible to calculate the volume of the system, and the system will be evacuated by removing three to five volumes by letting a tap run. If the well depth, casing size, or holding-tank volume is not readily available or is unknown, a tap will be opened and allowed to run at highest flow for at least 15 minutes. Well purging well be considered complete after three consistent readings of pH, temperature and conductivity. These readings can be obtained within the 15 minutes the tap is allowed to run. The well evacuation strategy will be documented in the field book.

Samples will be collected in containers in accordance with the sampling guidelines from a point as close to the well as possible and before the water is processed through any water treatment devices (e.g., softeners or filters). In many cases this may not be possible. When samples must be collected after the filtration or softener system, the situation will be documented in the logbook. The exact type of filtration system or softener in use will be recorded. To determine whether desorption of the filters is occurring, samples may be collected after water has passed through treatment devices. When possible, do not collect samples through a water hose. Samples should be collected directly from the spout.

If samples are taken from direct water main connections, the spigot will be flushed for 2 to 3 minutes (15 to 30 minutes is not necessary) to clear the service line. Water parameters (conductivity, temperature, and pH) will be measured. Well purging will be considered complete after three (3) consistent readings of pH, temperature and conductivity. Samples will *not* be collected from spigots after treatment (except as noted above) or from spigots that leak around their stems or that contain aeration devices or screens within the faucet.

For private wells equipped with hand or mechanical pumps, the water will be pumped for 5 minutes before the sample is collected directly from the spout.

SURFACE SOIL SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the soils with the minimum of samples. A surface inspection of the subject area will be made to locate pertinent features (e.g., rock outcrops, drainage patterns, surface runoff, erosion areas, etc.) and to evaluate the relationship among these features and potential sources of pollution. The locations of sediment deposition areas are good indicators of surface runoff direction.

A method of obtaining a shallow soil sample is to use stainless steel spoon or shovel. When deemed appropriate, a deeper soil sample may be obtained through the use of a soil corer. After collection, the soil sample will then be placed in the appropriate glass bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs. If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to eliminate headspace. A decontaminated shovel or spade can be used to uncover the top 6 inches of soil so the sample can be collected from beneath the surface.

Sampling equipment such as stainless steel scoops and spoons, and shovels or spades must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used. If dedicated equipment are not used, then an equipment rinsate sample shall be collected at the end of each sampling day to demonstrate decontamination efficiency by TNRCC field personnel.

SEDIMENT SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the sediments with the minimum of samples. The primary consideration in sample site selection will be to choose an area of quiescent settling with low hydrologic activity or energy, and to evaluate these areas and potential sources of pollution. For example, areas that are: 1) inside the bend of channels; 2) backwater areas or side channels; and 3) of heavy shoaling and deposition. Quiescent areas are conducive to the settling of finer materials.

Sediment samples will be collected by use of a stainless steel spoon; or for samples greater than six (6) inches beneath the water surface, samples will be collected using either an Ekman dredge or sediment corer. When using a dredge, it will be lowered to the bottom of the water body with a minimum of substrate disturbance. Once the dredge jaws have been triggered, the closed dredge will be retrieved at a moderate speed of less than two (2) feet/second. Water overlying the sediment in the dredge will be gently decanted by slightly tipping the dredge until the water runs out the top. The decanting process will be completed in a manner to avoid

the removal of surficial sediments. In order to avoid contamination from material on the dredge walls, a stainless steel spoon will be used to remove sediments to a depth of one inch and no closer than 0.75 inches to the wall of the dredge. The sediment sample will then be placed in the appropriate glass bottle. Pebbles and sticks will not be transferred to the sample bottle. Additional dredge samples will be collected as needed to fill the sample bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs.

If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to eliminate headspace. The Ekman dredge and stainless steel spoons must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used.

DECONTAMINATION PROCEDURES

To prevent contamination of samples by materials originating from the variety of on-site sampling tools and equipment, all sampling equipment (sample scoops, bailers, surface water dippers) will be decontaminated. Dedicated sampling equipment will be available for each sample planned. All equipment to be used at one site will be decontaminated in one batch prior to initiating any sampling. Each sampling tool will be placed in an individual sealable plastic bag or wrapped in a large plastic trash bag and closed with a custody seal. In the event that additional sampling is required or a sampling tool's integrity is questionable, then that tool will go through a decontamination process. The decontamination procedures are as follows:

1. Rinse equipment with tap (potable) water.

2. Clean the equipment with a brush in a solution of laboratory-grade detergent (Liquinox, Alconox, or equivalent) and potable water.

3. Rinse with tap water.

4. Rinse with 10 percent nitric acid solution, (trace metals grade) if analyzing for metals.

5. Rinse with distilled or deionized water.

6. If analyzing for organics, rinse with reagent-grade isopropanol.

7. Rinse with deionized water.

8. Air dry.

9. Place in plastic sealable bag if immediate use is not expected.

The sampling equipment will be cleaned as described above before its use for collecting each sample. After sampling is complete, each sample tool will be cleaned with a detergent wash and rinsed with distilled water to remove any potential contamination.

(B3) SAMPLE HANDLING/CUSTODY REQUIREMENTS

Sample custody is an integral part of any sample collection and analysis plan. Several steps for maintaining sample custody apply to field sample custody versus laboratory sample custody. First, in the field, the appropriate collection, identification, preservation, and shipment of the samples will ensure sample integrity. The second step is correct sample bottle identification and preparation. Lastly, when samples reach the laboratory, they are assigned a laboratory number and maintained at 4°C until sample preparation and analyses can be performed.

FIELD SAMPLE CUSTODY

Sample custody and documentation procedures described in this Section will be followed throughout all sample collection for all TNRCC SSIs. Components of sample custody are field logbooks, sample labels, sample tags, and chain-of-custody forms. CLP Organic and Inorganic Traffic Report (TR) forms will serve as chain-of-custody forms for this project. When Dioxin samples are to be collected the PCDD/PCDF Traffic Report (For Dioxin CLP Analysis) form will be used for this project.

FIELD LOGBOOKS

Bound field logbooks will be maintained by the Site Investigation Manager and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. Each page in the logbook will be initialed by the author and signed after the last entry of each day. All entries by persons other than the author will be initialed or signed. All entries will be signed and dated.

All information pertinent to the field survey and sampling will be recorded in the logbooks. The logbooks will be bound books with consecutively numbered pages that are at least 4 ½ inches by 7 inches in size. Waterproof ink will be used in making all entries. Entries in the logbook will include, at the minimum, the following:

· General information:

- Names and titles of author and assistant, date and time of entry, and physical/environmental conditions during field activity
- Location of sampling activity
- Name and title of field crew.

· Sampling documentation:

- Sample medium (e.g., soil)
- Description of sampling point(s)
- Date and time of collection
- Sample identification number(s).
- Photographs

· Other information:

- Names and titles of any site visitors or interviewees
- Field observations and unusual field conditions
- Any field measurements made (such as pH, conductivity, temperature) including specific calibration data and documentation of field equipment (serial number, decontamination, etc.)
- Modifications to the work plan
- Sample handling (e.g., preservation with ice).

None of the field logbooks or chain-of-custody documents will be destroyed or discarded, even if they are illegible or contain inaccuracies that require a replacement document. If a previously recorded value is discovered to be incorrect, the wrong information will be crossed out in such manner that it is still legible, the correct value written in, and the change initialed and dated. If the change is made by someone other than the original author or if the change is made on a subsequent day, a reason for the change will be recorded at the then-current active location in the logbook, with cross-references.

SAMPLE TAGS

All samples collected at the site will be placed in an appropriate sample container for preservation and shipment to the designated laboratory. Each sample will be identified with a separate identification label and tag. The bottles and ice chests will be sealed with custody seals. Sample identification tags and custody seals will be provided by the CLP Sample Management Office. The tag will indicate if the sample is a split sample. The label will contain the sample number. The following information will be recorded on the tag:

- Analyses to be performed
- Sample identification number
- Source/location of sample
- Type of sample (composite or grab)
- Preservatives used (ice)
- Date
- Time (a four-digit number indicating the 24-hr clock time collection; for example, 1430 for 2:30 PM)
- Sampler's signature
- CLP case number.

Once the tag is complete, a custody seal will be placed over the lid of the bottle. The custody seal will show the date and sampler's signature.

TRAFFIC REPORT FORMS

Introduction - Samples and Sample Numbers

The CLP organic and inorganic multi-sample Traffic Reports/Chain-of-Custody forms (TRs) document samples shipped to CLP laboratories. They also enable the Sample Management Office (SMO) and the Region to track samples and ensure that the samples are shipped to the appropriate contract laboratory. TRs will be used each time Routine Analytical Services (RAS) samples are shipped to a CLP laboratory. The TRs may document up to ten samples shipped to one CLP laboratory under one case number and RAS analytical program.

The TR includes a chain-of-custody record which is located at the bottom of the form. The form is used as physical evidence of sample custody. According to EPA enforcement requirements, official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. The lead Site Investigation Manager is responsible for the care and custody of the sample until sample shipment.

A sample is considered to be in custody if any of the following criteria are met:

1. The sample is in possession of the sampling team or is in view after being in possession.

2. The sample was in possession and then locked up or sealed to prevent tampering.

3. The sample is in a secured area, and security is documented.

CLP sample types are defined by the RAS analytical program. Under the RAS Protocol (SOW), a RAS sample consists of a low or medium concentration water matrix or a soil/sediment matrix that is single phase and homogeneous. No oily sample, nor a multi-phasic sample can be shipped to a CLP laboratory operating under the RAS contract. Such high concentration samples are handled only by Special Analytical Services (SAS) CLP laboratories. The collection and management of high concentration samples will be conducted in accordance with the requirements outlined in the "Region 6 CLP Training Manual", August 1996.

Low concentration samples are samples collected from off-site areas, where hazards are thought to be significantly reduced by normal environmental processes. Medium concentration samples are those where a compound or element may comprise as much as 15% of the total sample.

Low/medium concentration inorganic, low to medium concentration organic, and high concentration organic. Low/medium inorganic samples may be analyzed for total metals, cyanide, or both. Low/medium organic samples may be analyzed for VOAs, base/neutral/acid (BNAs), pesticide/PCBs, or any combination of these. High concentration organic samples may be analyzed for VOAs, BNA, and pesticide/PCBs. Inorganic samples are documented on Inorganic TRs. Organic and high concentration samples are documented on Organic TRs.

A CLP sample is one matrix - water or soil - never both. The CLP sample is further defined as consisting of all the sample aliquots from one station location, for each matrix and RAS analytical program.

The CLP generates unique sample numbers that must be assigned to each organic and inorganic sample. The unique CLP sample numbers are printed at SMO on adhesive labels and distributed to the region as requested. The field team leader will be responsible for assigning this critical sample number correctly and transcribing it accurately on the TR.

Organic sample numbers are in the format XX123, and have ten labels per strip four for extractables, two for VOAs, and four blank (extra). **UNUSED LABELS will be destroyed to prevent duplication of sample numbers.**

Inorganic sample numbers are in the format MXX123 and have seven labels per strip-- two for total metals, two for cyanide, and three extra (see Attachment 1). Remember that the unique sample number must only be used once. **EXTRA LABELS must be destroyed.**

Use only the labels provided by EPA Region 6. CLP sample numbers are alphabetically coded to correspond with each region as follows:

Table 2.3 EPA Region Sample Letter Codes

Letter Code			Letter Code		
Organic	Inorganic	Region	Organic	Inorganic	Region
A	MA	I	F	MF	VI
B	MB	II	G	MG	VII
C	MC	III	H	MH	VIII
D	MD	IV	Y	MY	IX
E	ME	V	J	MJ	X

Remember:

- TRs must be used for each case number with every shipment of samples to each CLP laboratory.
- Organic samples, high concentration samples, and inorganic samples are assigned separate, unique sample numbers. Each sample consists of all the sample aliquots from a sample station location for analysis in one of the three analytical programs.
- A CLP RAS sample will be analyzed as either a water or a soil sample.
- Prevent accidental duplication of sample numbers by destroying unused labels.
- Use the sample numbers specific to EPA Region 6.

· Contact the Program Manager or Technical Director at telephone number 512/239-2514 or 512/239-2512 if you need to collect more than the previously approved number of samples or a high concentration sample.

· Call Regional Sample Control Center (RSCC) at telephone number 281/983-2130 or 281/983-2137 if you have any questions about using TRs.

Forms Completion - Case Documentation

Instructions for filling out the Organic and Inorganic Traffic Report/Chain of Custody forms are as follows:

Top of Form
· SAS Number

· Enter this number only if explicitly told to do so by the RSCC.

· Case Number

· Enter this number.

Box No. 1

· Project code/site information:

· Leave the Project Code, Account Code, Regional Information and Non-Superfund Program fields blank.

· Enter the Site name, City/State and Site Spill ID in the designated spaces.

Box No. 2

· Regional information:

· Enter the EPA Region number (6), the name of your Sampling Company (TNRCC), and your name and signature in the designated spaces.

Box No. 3

· Type of activity:

· Check funding level for sampling. Next, check the code which describes the task of the sampling mission:

Funding Level

SF - Superfund
PRP - Potential responsible party
ST - State
FED - Federal

Pre-Remedial

PA - Preliminary Assessment
SSI - Screening Site Investigation
LSI - Listing Site Investigation

Remedial

RIFS - Remedial investigation feasibility study
RD - Remedial design
O&M - Operations and maintenance
NPLD - National priorities list delete

Removal

CLEM - Classic emergency
REMA - Removal assessment
REM - Removal
Oil - Oil response
UST - Underground storage tank response

Box No. 4

· Shipping Information:

· Enter the Date Shipped, the Carrier (i.e. Federal Express, Purolator, Airborne) and the Airbill Number in the appropriate spaces.

Box No. 5

· Ship to:

· Enter the name of the CLP laboratory contact (sample custodian) and its full address in the box.

Box No. 6

· Preservative:

· This box provides a list of commonly-used preservatives. Please enter the appropriate preservative used in Column D.

Box No. 7

· Sample description:

· This box provides a list of the description/matrices of samples that are collected. Please enter the appropriate description in Column A.

Completing the Form - Sample Documentation

· Carefully transcribe the CLP Sample Number(s) from the printed sample labels on the TR in the space provided.

Note: If you have made a mistake, do NOT attempt to erase or write over your mistake. Draw a single line through the mistake and initial and date it. Then, enter the correct information on the next line.

Complete columns A through G to describe the sample.

Column A, Sample Description

Enter the appropriate sample description code from Box No. 7.

When out in the field:

If sampling groundwater or surface water, describe both VOA TRIP BLANKS and EQUIPMENT RINSATE SAMPLES as No. 1 "Surface Water or Groundwater"

If sampling only soil/sediment, describe both the EQUIPMENT RINSATE SAMPLE and the FIELD BLANK SAMPLE as No. 4 "Field QC".

When conducting a laboratory decontamination event:

Describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

Note: Item No. 6 "Oil" and item No. 7 "Waste" are for SAS projects only. DO NOT SHIP OILY SAMPLES OR WASTE SAMPLES WITHOUT MAKING PRIOR ARRANGEMENTS WITH THE PROJECT MANAGER AND RSCC.

Column B, Concentration

Organic--If sample is estimated to be low or medium concentration, enter "L." When shipping SAS high concentration samples (previously arranged with Program Manager and RSCC), enter"H."

Inorganic--Enter "L" for low concentration, "M" for medium concentration, and "H" for high concentration (under previous SAS arrangement).

Note: Ship medium and high concentration organic and inorganic samples in metal cans.

Column C, Sample Type

Please enter which type of sample (composite or grab) was collected.

Column D, Preservation

Please enter preservation used (i.e., HCL, NaOH, HNO_3, H_2SO_4) refer to Box No. 6 or the reference number of the preservation (1-7, N). Always include ice as a preservative in addition to any chemical preservative used.

Column E, RAS Analysis

Check the analytical fractions requested for each sample, for example, VOAs, SVs, and pesticides are for low/medium concentration organics. Request only total metals and cyanide for RAS low/medium concentration inorganics.

Note: Aroclors/Toxaphenes may be requested, when using the High Concentration SOW, in a SAS Request.

Note: Either total or dissolved metals can be requested for each individual inorganic sample assigned a unique sample number, but not both analyses. A unique number must be assigned for each, even though they are from the same station location.

Column F, Regional Specific Tracking Number or Tag Number

Enter the Region specific tracking number or tag number(s) in the space provided. Since space is limited try to use tag numbers in a sequential order.

Column G, Station Location Number

Enter the Station Location Number in the space provided.

Column H, Month/Day/Year/Time of Sample Collection

Record the month, day, year, and time in military time (e.g., 1600 hours = 4:00 P.M.) of sample collection.

Column I, Sampler Initials

Enter the samplers initials.

Column J, Corresponding CLP Organic/Inorganic- Sample No.

Enter the corresponding CLP sample number for organic or inorganic analysis.

Column K, Designated Field QC

Enter the appropriate qualifier for "Blind" Field QC samples in this column.

Note: All samples must have a qualifier.

Blind Field QC	Qualifier
Blank	B
Duplicate	D
Rinsate	R
Performance Evaluation Samples	PE
Not a QC sample	---------

Note: **This information will be entered into EPA Headquarters database to track QC sample data. Please complete this Section carefully and accurately.**

Box Titled, "Shipment for Case Complete (Y/N)"

This should reflect the status of the samples scheduled at a lab for a specific case. When ALL samples scheduled/collected for shipment to a lab for a specific case have been shipped, the case is complete.

Box Titled, "Page 1 of "

Please enter the number of TRs per shipment.

Box Titled, "Sample Used for Spike and/or Duplicate"

Please enter sample number to be used for matrix spike and/or duplicate sample (internal lab QC). One per twenty/matrix/concentration/lab. See back of TR form.

Box Titled, "Additional Sampler Signatures"

Please record any additional sampler signatures you are unable to record in box 2.

Box Titled, "Chain-of-Custody Seal Number"

Leave the Chain-of-Custody Seal Number blank (Not used in Region 6).

Box Titled, "Split Samples Accepted/Declined"

Sampler should ask sight owner, PRP, etc. whether they want split samples taken. The split samples are either accepted or declined. Sampler should record their signature if split samples are collected and check the appropriate box.

How and When to Separate and Send Traffic Report/Chain-of-Custody Form Copies

When all paperwork has been completed by the sampler and samples are ready to be shipped:

Bottom 2 copies (white and yellow) of the traffic report/chain-of-custody forms should be placed in a plastic bag and taped to the inside of the cooler.

Top Blue/Green copy - Send to Region within five (5) working days from date of sample shipment. On this copy indicate in Column K the duplicate sample number.

Myra Perez
USEPA Region 6
10625 Fallstone Road
Houston, Texas 77099

Pink copy - Retain copy for files.

Instructions on the Reverse

Instructions summarizing CLP sample volumes, packaging, and shipment reporting requirements are printed on the back of the TRs.

SHIPPING OF SAMPLES

Samples will be shipped and delivered to the designated laboratory for analysis daily. During sampling and sample shipment, the lead Site Investigation Manager (or designee) will contact the SMO (designated on the CLP RAS Lab Assignment information facsimile) to inform them of shipments. **TNRCC WILL NOT CONTACT THE RECEIVING LABORATORY!!**

The samples will be shipped in ice chests by an overnight carrier such as Airborne Express. The TR forms (white and yellow) will be placed within the ice chest, which will be sealed with custody seals and/or tamper-resistant tape. Custody seals will be signed by the sample custodian shipping the samples. The air bill number will be noted on the chain-of-custody form. In addition the Airbill and TR form(s), each ice chest will contain an additional Airbill to provide for return of the ice chest to Judie Mattocks MC-142, Pollution Cleanup Division, TNRCC, Technical Park Center, Building D, 12100 Park 35 Circle, Austin, Texas 78753.

(B4) ANALYTICAL PROCEDURES and (B10) DATA MANAGEMENT

All analytical procedures will conform to analytical methods specified in the Routine Analytical Services (RAS) contract with the EPA. All data is managed by EPA in accordance with the USEPA Contract Laboratory Program Statement of Works for Organic and Inorganic Analyses. Data received by TNRCC in accordance with the 2000 and 2001 Cooperative Agreement is returned to EPA after validation for use in the SSI reports. EPA maintains full control of record-keeping procedures, receipt of data from the laboratory, and for detecting/correcting laboratory errors.

As per the EPA-CLP Statement of Work for Organic Analysis (including February 1994 revision), laboratories are required to perform any method specified in Exhibit D for volatile organic compounds (CLP-VOA), semivolatile organic compounds (CLP-SV), and pesticide/PCB compounds (CLP-PEST). As per the EPA-CLP Statement of Work for inorganic analysis (including February 1994 revision), laboratories are required to perform methods specified in Exhibit D. Metals will be analyzed using the 200 series, CLP-modified, methods as specified in Exhibit D. Cyanide will be analyzed by method 335.2 CLP-modified. Table 2.3 list the methods to be performed during this project under the RAS contract.

Table 2.4 Analytical Procedures for USEPA-CLP

Parameters	Method
Organics	
Volatile organics (VOA)	CLP-VOA
Semivolatile organics (BNA)	CLP-SV
Pesticides/PCBs	CLP-PEST
Inorganics	
Cyanides	335.2 CLP-M*
Metals	
Aluminum	202.2 CLP-M or 202.1 CLP-M
Antimony	204.2 CLP-M
Arsenic	206.2 CLP-M
Barium	208.2 CLP-M or 202.1 CLP-M
Beryllium	210.2 CLP-M
Cadmium	213.2 CLP-M
Calcium	218.2 CLP-M
Chromium	215.1 CLP-M
Cobalt	219.2 CLP-M or 219.1 CLP-M
Copper	220.2 CLP-M or 220.1 CLP-M
Iron	236.2 CLP-M or 236.1 CLP-M
Lead	239.2 CLP-M
Magnesium	242.1 CLP-M
Manganese	243.2 CLP-M or 243.1 CLP-M
Mercury	245.1 CLP-M, 245.2 CLP-M, or 245.5 CLP-M
Nickel	249.2 CLP-M or 249.1 CLP-M
Potassium	258.1 CLP-M
Selenium	270.2 CLP-M
Silver	272.2 CLP-M
Sodium	273.1 CLP-M
Thallium	279.2 CLP-M
Vanadium	286.2 CLP-M or 286.1 CLP-M
Zinc	289.2 CLP-M or 289.1 CLP-M

* CLP-M modified for the Contract Laboratory Program

(B5) QUALITY CONTROL REQUIREMENTS

Quality assurance for analytical work on this project will involve analysis of blank samples, spiked samples, and duplicate samples. For each group of 20 samples (or less if fewer than 20 samples are collected) of similar matrix (i.e., groundwater/surface water, soil/sediment) collected at each site, CLP internal laboratory QA/QC analysis will be conducted on one blank, one spiked, and one duplicate spiked sample. Field duplicates will be collected at a rate of 10% for each matrix and/or one per day, whichever is greater. Also, the TNRCC will include in each ice chest with samples to be shipped for analysis a temperature blank taped to the side of the chest prior to shipping.

LABORATORY QUALITY CONTROL BLANKS, SPIKED BLANKS, AND MATRIX SPIKES

Analysis of blank samples verifies that the analytical method does not introduce contaminants. The spiked blank is generated by addition of standard solutions to the blank water. The matrix spike will be generated by the CLP laboratory through the addition of standard solutions to a randomly selected field sample. Extra volume (triple volume) for a matrix spike and matrix spike duplicate will be collected for one water sample (groundwater or surface water, but not both) by the field team and sent to the assigned CLP Laboratory for internal quality control. In addition, one soil sample (no extra volume) will be designated on the TR by the field team and sent to the designated CLP laboratory for internal quality control.

FIELD QUALITY CONTROL SAMPLES

All samples will be collected with dedicated equipment, if possible. All sampling equipment will be decontaminated prior to initiating sampling activities. Three types of blanks will be taken in the field. The first type, **field blanks**, are blanks that are exposed to the same contamination as the field samples (e.g., airborne contaminants that are not from the waste being sampled). The second type, **trip blanks**, are collected for volatiles only. Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA **trip blank** will be analyzed to monitor for possible sample contamination. The trip blank also serves to detect contaminants in the sample bottles. These blanks are similar to field blanks with the exception that they are not exposed to field conditions. They allow evaluation of contamination generated from sample containers and changes occurring during the shipping and laboratory storage process. The third type, **equipment rinsate** blanks, will consist of CLP-specified grade water that has been poured over the equipment after completion of decontamination. The number of blanks collected in the field will be specified by the work plans for each site. The blanks collected in the field will not be counted for the laboratory's quality control protocol for matrix spikes or duplicate samples.

FIELD DUPLICATES

For samples collected for laboratory analysis, field duplicates will be collected at a rate of 10 percent of the total number of samples collected during each day of sampling for each sample matrix type at every site. The number of samples collected will be rounded up to the next increment of ten, such that twenty-one samples would require collection of three duplicates, if collected within three days. At least one field duplicate will be collected per day of sampling and will be packaged and sent to the laboratory for analysis with the other samples of the same sample matrix type.

EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples will be collected to establish that proper sample bottle preparation, decontamination and handling techniques have been employed. Dedicated sample equipment will be used at each site for each sample station. All sample equipment will be decontaminated in the field and carefully packaged for return to the TNRCC Central Office. The decontaminated equipment will be taken to the TNRCC Region 11 Austin Office laboratory where one equipment blank will be collected and shipped to the assigned CLP laboratory for analysis. The equipment rinsate sample will be prepared by collecting CLP-specified grade water from the final rinse of the sampling equipment. Finally, the sample equipment will be placed in individual dated plastic bags, including chain-of-custody seals.

If sample equipment must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and a rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater, and shipped to the assigned CLP laboratory with the associated sample matrix type. The number and type of QA samples at each site will be estimated in the SSI work plan. Modifications to the plan may be deemed necessary by the site investigation manager depending on field conditions, the on-site determination of additions or removals of sample locations, and the number of days required to complete the site sampling investigation.

(B7) CALIBRATION PROCEDURES AND FREQUENCY

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations also may be performed at the start and completion of each test run. However, such calibrations will be re-initiated after any delay caused by meals, work shift change, or damage incurred. Standards will be used and duplicate samples analyzed in the field to verify pH and specific conductance data.

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the EPA-CLP specifications. Calibration of laboratory equipment will be based on approved written procedures. It is the responsibility of the EPA data validators to ensure that the proper calibration protocols specified in the CLP statement of work were used. These calibration procedures and frequencies are included in the EPA Contract Laboratory Program, "Statement of Work for Organic Analysis" including revisions through August, 1994 and in the EPA Contract Laboratory Program, "Statement of Work for Inorganic Analysis" including revisions through February, 1994.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities in accordance with EPA-CLP requirements. Calibration records of assigned laboratories will be filed and maintained at the laboratory location where the work is performed and will be subject to QA audit.

(B6 and B8) INSTRUMENT/EQUIPMENT TESTING, INSPECTION, PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedures developed by the operators.

SCHEDULES

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based on experience and previous use of the equipment.

RECORDS

Logs will be established to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced will be reviewed, maintained, and filed by the operator when equipment, instruments, tools, and gauges are used at the sites. The Program Quality Assurance Specialist will audit these records to verify complete adherence to these procedures. Any deviations from these procedures will be reported to the Program Technical Director.

SECTION C

ASSESSMENT/OVERSIGHT

(C1) ASSESSMENT AND RESPONSE

QA audits are performed by the Program Quality Assurance Specialist. Functioning as an independent agent, the Program Quality Assurance Specialist will plan, schedule, and approve system and process audits according to procedures determined by the Program Technical Director, customized to specific project requirements. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, activities, and documentation of the measurement system(s), including subcontractor activities.

The Program Quality Assurance Specialist will report directly to the Technical Director. The Program Quality Assurance Specialist will coordinate and monitor the overall QA program, including all on-site activities and the quality control programs of the laboratories. Implementing prompt, effective, and accurate corrective action in response to noncompliance that may occur on projects is absolutely essential in assuring the quality of the end product.

QUALITY SYSTEM AUDIT

A quality system audit refers to a detailed evaluation of the Project's Quality Assurance Program to determine its conformance to the Multi-Site Cooperative Agreement commitments and standard TNRCC procedures. Such an audit includes preparation of formal plans and a checklist based on established requirements. A copy of a field audit checklist is at the end of this section. Audits will be performed on TNRCC work.

(C2) REPORTS TO MANAGEMENT

Audit reports will be written by the Program Quality Assurance Specialist after gathering and evaluating all available data. Items, activities, and documents determined by the Program Quality Assurance Specialist to be non-compliant will be identified at interviews conducted with the Technical Director and Program Manager. Non-compliant elements will be logged, documented, and controlled through audit findings, which are attached to the audit report. These audit findings are directed to the Program Manager to resolve the noncompliance satisfactorily in a specified and timely manner.

All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the Program QA/QC Officer prior to issue. QA verification of acceptable resolutions may be determined by re-audit for documented surveillance of the item or activity. Upon verification acceptance, the Program QA/QC Officer will close out the audit report and findings.

It is the Program Manager's overall responsibility to ensure that all corrective actions to resolve audit findings are acted upon promptly and satisfactorily by project personnel.

FIELD AUDIT CHECKLIST

Project No. _____

Project Name _____

Site Investigation Manager _____

Auditor _____

Dates of Field Audit _/__/__ - _/__/__

A: Health and Safety

1. The Site-Specific Health and Safety Plan has been prepared by the TNRCC Site Investigation Manager and subsequently approved by the TNRCC Program Manager and TNRCC Health and Safety Officer prior to arrival to the site.

Yes ___ No ___

Comments_____

_____

2. The Site-Specific Health and Safety Plan has been signed by all who intend to enter within the site boundaries prior to entry onto the site.

Yes ___ No ___

Comments_____

_____

B: Project Organization Adequate ___ Marginal ___ Failed ___

1. Did the Site Investigation Manager hold a briefing with each participant to go over any concerns or questions for project organization?

Yes ___ No ___

Comments_____

_____

2. Did the Site Investigation Manager provide appropriate number and types of material supplies necessary to collect samples (jars, bottles, gloves, pens, coolers, coolant, preservatives, protective gear, Work Plan, Health and Safety Plan, CLP, QAPP or other reference material)?

Yes ___ No ___

Comments_____

_____

3. Were additional instructions given to each participant not otherwise found in the preliminary written material, such as the Site-Specific Work Plan, Health and Safety Plan, CLP or QAPP?

Not Applicable ___

Additional Instructions_____

_____

C: Sample Collection Procedures

1a. Did the Site Investigation Manager ensure that the sampler collected adequate volumes of sample to allow for the planned sample analyses and field duplicates, plus any laboratory QC blanks and laboratory QC duplicates/spikes, as applicable?

Yes ___ No ___

Comments_____

_____

1b. Did the Site Investigation Manager provide a supply of the appropriate type of sample containers for the samples collected?

Yes ___ No ___ No Modifications ___ Modifications ___

Comments_____

_____

2. Were samples collected as stated in the Site-Specific Work Plan (number, frequency, and type)?

Yes ___ No ___ No Modifications ___ Modifications ___

Sample Modifications_____

_____

D: Chain of Custody

1a. Did the Site Investigation Manager ensure that the sample tags were properly completed and attached to each sample container?

Yes ___ No ___

Comments_____

_____

1b. Did the Site Investigation Manager ensure that the custody seals were properly completed and attached to each sample container in unbroken condition?

Yes ___ No ___

Comments_____

_____

1c. Did the Site Investigation Manager ensure that each sample container was labeled with the sample number and protected with clear tap?

Yes ___ No ___

Comments_____

_____

2. Was each completed traffic report , faxed to EPA, original copy mailed to EPA, and copies corrected as necessary?

Yes ___ No ___

Comments_____

_____

3. Did the traffic report accompany each shipment to the correct EPA contract lab?

Yes ___ No ___

Comments_____

_____

E: Field Observations Adequate ___ Marginal ___ Failed ___

1. Were field observations written in ink and presented accurately in the field logbook, and was each page signed and dated?

Yes ___ No ___

Comments_____

_____

2. Were photographs logged in the logbook with the date, time, location, name of person taking the picture, type of sample, sample number, and the photo number?

Yes ___ No ___

Comments_____

_____

3. Prior to use, did the Site Investigation Manager ensure that the measuring equipment was calibrated to standard procedures as presented in accompanied documents written specifically for the instrument?

Yes ___ No ___

Comments_____

_____

4. Have any accountable documents been lost?

Not Applicable ___

Documents Lost_____

_____

General Comments or Concerns Regarding the Sampling Procedures, Organization, and Site Investigation Management:

_____

_____

_____

Printed Name of Auditor_____

Signature of Auditor _____ Date_____

SECTION D

DATA VALIDATION AND USABILITY

(D1 and D2) DATA REVIEW, VALIDATION, VERIFICATION METHODS

FIELD MEASUREMENT DATA

Field measurements will be made by field geologists and engineers, environmental analysts, and technicians. The following standard reporting units will be used during all phases of the project:

- pH will be reported to 0.1 standard units.
- Specific conductance will be reported to two significant figures below 100 umhos per centimeter (umhos/cm) and three significant figures above 100 umhos/cm.
- Temperature will be reported to the nearest 0.5° Celsius (°C).
- Water levels measured in wells will be reported to the nearest 0.1 foot.
- Soil sampling depths will be reported to the nearest 0.5 foot.

Field data will be validated using different procedures.

- Checklists will be used during the processing of data that will identify errors - for example, identifying errors in identification codes.
- Checks may be made for consistency with parallel data sets (data sets obtained presumably from the same population) - for example, from the same region of the aquifer or volume of soil.

The purpose of these validation checks and tests is to identify outliers, i.e., observations that do not conform to the pattern established by other observations. Outliers may be the result of transcription error or instrumental breakdowns. Outliers may also be manifestations of a greater degree of spatial or temporal variability than expected.

If an outlier is identified, a decision concerning its fate will be rendered. Obvious mistakes in data will be corrected when possible, and the correct value will be inserted. If the correct value cannot be obtained, the data may be excluded. An attempt will be made to explain the existence of the outlier. If no plausible explanation can be found for the outlier, it may be excluded, but a note to that effect will be included in the report. Also, an attempt will be made to determine the effect of the outlier when both included and excluded in the data set.

LABORATORY DATA

The procedures used for calculations and data reduction are specified in each method referenced previously. It will be the responsibility of the laboratory to follow these procedures.

VALIDATION

The laboratory data will be validated by EPA according to the following EPA documents:

- National Functional Guidelines for Organic Data Review (August 1994)
- National Functional Guidelines for Evaluating Inorganics Analyses (February 1994).

REPORTING

The project analytical report from the CLP laboratory will contain data sheets and the results of analysis of QC samples. Analytical reports may also contain the following items:

- Project identification
- Field sample number
- Laboratory sample number
- Sample matrix description
- Date of sample collection
- Analytical method description and reference citation
- Individual parameter results
- Date of analysis (extraction, first run, and subsequent runs)
- Quantitation limits achieved
- Dilution or concentration factors
- Corresponding QC report (including duplicates and spikes).

Matrix interferences on some of the samples, particularly the waste samples, may result in increased detection limits. Matrix interference will be reported as the cause of increased detection limits.

(D3) RECONCILIATION WITH DQO

The following procedures have been established to assure that conditions adverse to quality--malfunctions, deficiencies, deviations, and errors--are promptly investigated, evaluated, and corrected.

INITIATION OF CORRECTIVE ACTION

When a condition adverse to quality is noted at the project site, laboratory, or subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated at a minimum:

- When predetermined acceptance standards--objectives for precision, accuracy, and completeness--are not attained.
- When procedures or data compiled are determined to be faulty.
- When equipment or instrumentation is found faulty.
- When samples and test results cannot be traced with certainty.
- When quality assurance requirements have been violated.
- When designated approvals have been circumvented
- As a result of an audit.

PROCEDURE DESCRIPTION

Project management and staff, including field investigation teams, sample control personnel, and laboratory groups, monitor ongoing work performance in the normal course of daily responsibilities.

Following identification of an adverse condition or quality assurance problem, notification of the deficiency will be made to the project manager and senior individual in charge of the activity found to be deficient, along with recommendations for correction. Following implementation of corrective action, the senior individual in charge will report actions taken and results to the Program Manager and Program QA/QC Officer.

EQUATIONS FOR PRECISION, ACCURACY, AND COMPLETENESS

Planned procedures used to assess data precision and accuracy are in accordance with 44 FR 69533, "Guidelines Establishing Test Procedures for the Analyses of Pollutants", and appendix III, "Example Quality Assurance and Quality Control Procedures for Organic Priority Pollutants", December 3, 1979. Completeness is recorded by comparing the number of parameters initially analyzed with the number of parameters successfully completed and validated.

PRECISION

Relative percent difference (RPD) is calculated as:

$$RPD = \frac{|x_1 - x_2|}{x} \times 100\%$$

where:
x_1 = analyte concentration of first duplicate
x_2 = analyte concentration of second duplicate
x = average analyte concentration of duplicates 1 and 2.

ACCURACY

Accuracy is expressed as a percent recovery (PR), calculated by:

$$PR = \frac{(A-B)}{C} \times 100\%$$

where:
A = spiked sample result (SSR)
B = sample result (SR)
C = spike added (SA).

COMPLETENESS

The completeness of the data will be determined by:

$$PC = \frac{N_a}{N_t} \times 100\%$$

where:
PC = percent complete
N_a = number of actual valid results
N_t = number of theoretical results obtainable.

APPENDIX A

Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule

The Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule will be inserted as soon as it becomes available

APPENDIX B

Sampler's Guide to the Contract Laboratory Program

United States
Environmental Protection
Agency

Office of
Solid Waste and
Emergency Response

9240.0-30
EPA/540/R-96/032
PB96-963511

Superfund

SAMPLER'S GUIDE TO THE CONTRACT LABORATORY PROGRAM

9240.0-30
EPA/540/R-96/032
PB96-963511

Sampler's Guide to the Contract Laboratory Program

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

NOTICE

The policies and procedures set forth here are intended as guidance to Agency and other government employees. They do not constitute rulemaking by the Agency, and may not be relied on to create a substantive or procedural right enforceable by any other person. The Government may take action that is at variance with the policies and procedures in this manual.

For further information on the Contract Laboratory Program (CLP) or to obtain a copy of the *User's Guide to the Contract Laboratory Program*, contact the National Technical Information Service (NTIS) of the United States Department of Commerce at (703) 487-4650. In addition, the entire current Superfund bibliography may be purchased from NTIS at (703) 487-4650.

Additional copies of this manual can be obtained from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

CONTENTS

LIST OF EXHIBITS

PREFACE

The *Sampler's Guide to the Contract Laboratory Program* has been prepared by the U.S. Environmental Protection Agency Analytical Operations Center. It is specifically designed for samplers to help clarify sampling procedures necessary to submit samples for CLP analysis. The *Sampler's Guide to the Contract Laboratory Program* acts as a reference for the Regions and sampling contractors to promote consistency in sampling procedures throughout the Regions and to ensure the proper adherence to CLP requirements. This document is intended to be used as a supplement to, not as a replacement for, existing Regional sampling instructions.

ACKNOWLEDGMENTS

This document was developed by EPA's Office of Emergency and Remedial Response (OERR). The efforts of the work group who assisted in the rewrite of this manual include:

A. F. Beliveau	Region 1,
Philip Guarraia	Region 2,
Hanif Sheikh	Region 2,
Fred Sloan	Region 4,
Gary Bennett	Region 4,
Brian Freeman	Region 5,
Christie Macdowell	Region 6,
Jim Gindelberger	Region 6,
TinaDiebold	Region 8,
Gail Jones	Region 9,
Laura Castrilli	Region 10,
Bruce Woods	Region 10 and
Robert Melton	Region 10

from the Headquarters' staff:

Patricia Gowland,
Howard Fribush,
Michael Wilson and
Lucinda Taylor.

1.0 THE CLP NETWORK

The Contract Laboratory Program (CLP) is a national program of commercial contractor laboratories supporting the Environmental Protection Agency's (EPA's) Superfund nationwide effort to clean up designated hazardous waste sites. Superfund was originally established under the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and presently exists under the 1986 Superfund Amendments and Reauthorization Act (SARA).

The CLP provides chemical analytical services using state-of-the-art technology for the ten EPA Regions. The program is structured to provide data of known and documented quality for use in supporting EPA enforcement actions or other user needs. To achieve this goal, the CLP has established strict quality assurance procedures and detailed documentation requirements.

The CLP is directed by the Analytical Operations Center (AOC) in the Office of Emergency and Remedial Response (OERR) in the Office of Solid Waste and Emergency Response (OSWER). AOC includes the Organic and Inorganic Program Coordinators and the Administrative Project Officers (APOs) for the CLP laboratories, the Project Officer for the Contract Laboratory Analytical Services Support (CLASS) contract, the Project Officer for the Quality Assurance Technical Support (QATS) contract, the National Automated Data Processing (ADP) Manager, and the Quality Assurance Coordinator. AOC responsibilities include the following:

- Development of analytical methods;
- Development of the Statements of Work (these documents define required analytical methods, quality control, detection/quantitation limits and holding times) for the analytical services procured under the CLP;
- Development of and implementing policies and budgets for Superfund analytical operations;
- Development of information management policies and products for analytical data;
- Management of the CLASS and QATS contracts;
- National administration, evaluation, and management of the CLP; and
- Direction of CLP quality assurance activities in coordination with overall OSWER quality assurance activities.

In coordinating Superfund sampling efforts, AOC is supported by the APOs, the contractor-operated CLASS office, the Regional Technical Project Officers (TPOs), the Regional Sample Control Centers (RSCCs), and the Regional Site Managers (Site Assesssment Managers, On-Scene Coordinators and Remedial Project Managers). See Exhibit 1-1 for a generalized organization chart (functions may vary by Regions).

Currently, AOC is allowing other Agencies/Departments the opportunity to "buy-into" the CLP. This is being done on a cost-reimbursable basis through Interagency Agreements.

Administrative Project Officer

The APO is responsible for monitoring laboratory performance, initiating contract action, and funding laboratory contracts. The APO works closely with the TPOs and laboratories to resolve problems. The APO is also responsible for developing analytical methods and designing new CLP services.

Contract Laboratory Analytical Services Support

The CLASS contractor provides management, operations, and administrative support to the CLP. The CLASS contractor routinely receives Regional analytical requests, coordinates and schedules sample analyses, tracks sample shipments and analyses, receives and checks data for completeness and compliance, processes laboratory invoices, and maintains a repository of sampling records and program data.

Regional Technical Project Officer

The TPO monitors the technical performance of the contract laboratories in his or her Region. The TPO works closely with the APOs in responding to laboratory technical problems and leads laboratory on-site evaluations. The TPO is the sole Regional official who may contact the CLP laboratories.

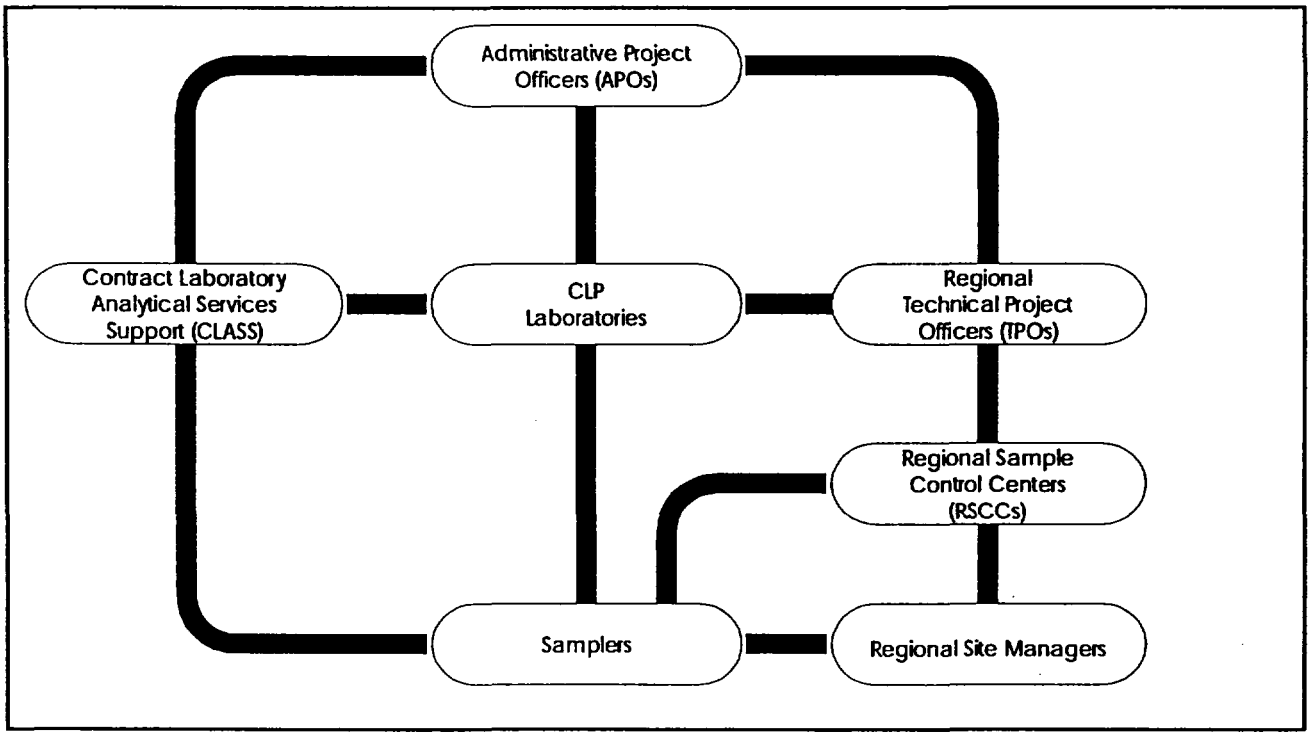
Regional Sample Control Center

In most Regions, the RSCC coordinates the sampling efforts and serves as the central point of contact for sampling questions and problems. The RSCC assists in coordinating the level of Regional sampling activities to correspond with the monthly projected demand for analytical services.

Regional Site Manager

The Regional Site Manager (Site Assessment Manager, On-Scene Coordinator or Remedial Project Manager) is responsible for coordinating the development of data quality objectives and for overseeing project-specific remedial contractors, state officials, or private parties conducting site sampling efforts.

Exhibit 1-1. CLP Organization Chart



1.1. PROCUREMENT OF CONTRACT LABORATORY SERVICES

1.1.1. Procedures for requesting/scheduling analytical services.

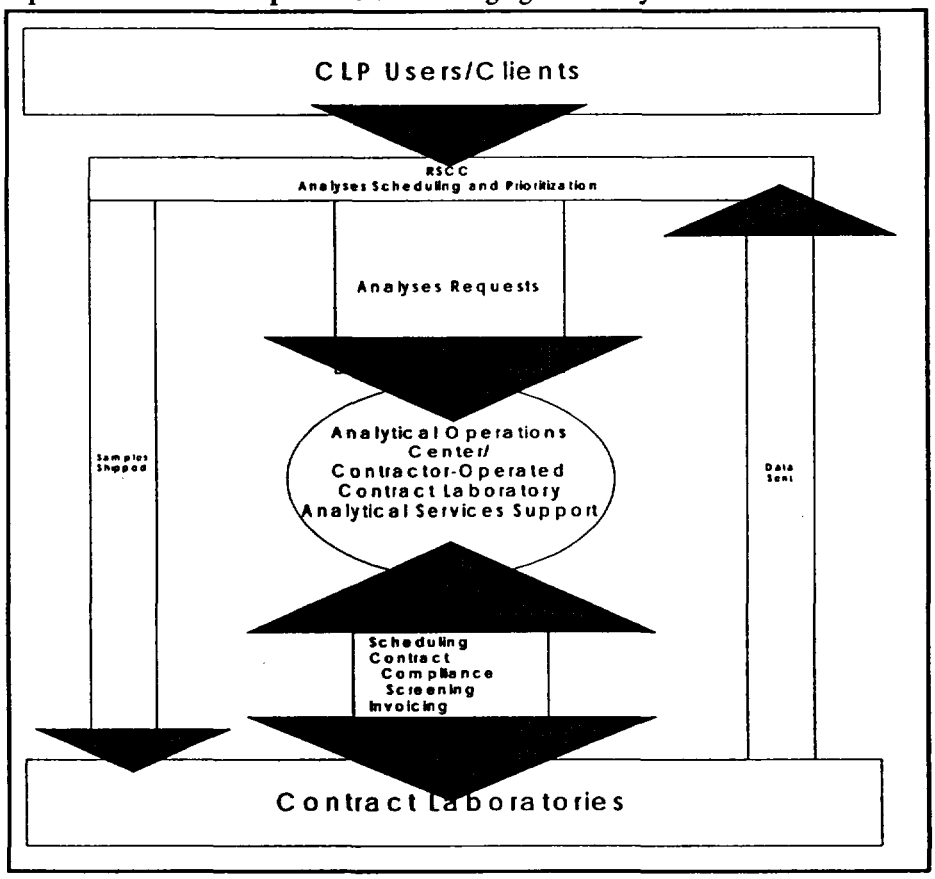
To initiate a CLP Analytical Services (CLPAS) request, the RSCC or Regional/Agency designee contacts the appropriate CLASS Coordinator by telephone or fax and provides a complete description of the analytical requirement. The information required to initiate a CLPAS request includes the sampler's name, sampler's phone number, site name, city and state where the site is located, site spill identification number, expected date of sample shipment, number of samples, type of analyses, turn-around-time, fractions to be analyzed, and sample matrix.

1.1.1. Timing and scheduling

By noon eastern time on the Wednesday of the week prior to the scheduled start of a planned sampling activity, the RSCC or Regional/Agency designee contacts the CLASS Coordinator to place a CLPAS request and to provide scheduling information to the CLASS contractor. This lead-time enables the laboratories to prepare for EPA samples, and to provide for resolution of sampling questions. It also allows the sampler time to prepare the required sample documentation prior to field activity, if appropriate. Late scheduling requests (i.e., requests received between Wednesday noon and the date of sampling) are accommodated with available laboratory capacity. To avoid possible shortfalls, Regions are strongly encouraged to submit all CLPAS scheduling requests prior to Wednesday noon, when possible. A more complete discussion of the procedures for arranging CLP analytical services can be found in the User's Guide to the Contract Laboratory Program.

1.1.2. Chain of Communication within the CLP

Exhibit 1-2.



2.0 CONTRACT LABORATORY ANALYTICAL SERVICCES SUPPORT

The CLP provides the user community with a wide range of Contract Laboratory Program Analytical Services (CLPAS) through laboratories that have been awarded government contracts under the CLP.

CLPAS services generally apply to the analysis of water and soil/sediment samples for specific target organic and inorganic analytes, and are performed under firm, fixed-price, standardized contracts that include standard analytical methodologies, quality assurance and quality control (QA/QC) procedures, and data reporting formats. The CLP analytical services are shown with their corresponding fractions and concentrations in Exhibit 2-1.

EPA Regions may request a portion of the analytical services provided under the CLP. For example, CLP Analytical Services-volatile analysis may be ordered without CLP Analytical Services-semi-volatile analysis or CLP Analytical Services-pesticide/Aroclor analysis. However, CLP Analytical Services-pesticide analysis may not be ordered without CLP Analytical Services-Aroclor analysis, since fractions may not be split.

Exhibit 2-1. Contract Laboratory Program Analytical Services

STATUS OF SERVICE	ANALYTICAL SERVICES	FRACTIONS	CONCENTRATION[1]	MATRIX	TURN-AROUND TIMES[2]
Available	Multi-Media, Multi-Concentration Organics (Low/Medium)	Volatiles, Semivolatiles, Pesticides/Aroclors	Low, Medium	Water, Soil/ Sediment	14 or 35 days, depending on contract requirements
	Multi-Media, Multi-Concentration Inorganics (Low/Medium)	Total Metals, Dissolved Metals, Cyanide	Low, Medium	Water, Soil/ Sediment	14 or 35 days, depending on contract requirements
Future	Low Concentration Organics	Volatiles, Semivolatiles, Pesticides/Aroclors	Low[3]	Water	14 days
	Water Quality/ Wet Chemistry	Alkalinity, Ammonia, Total Organic Carbon, Chemical Oxygen Demand, Chloride, Nitrate/Nitrite, Phosphorus, Total Dissolved Solids, Total Suspended Solids, Sulfate	Low, Medium, High	Water	14 days

[1] See Section 3.1, CLPAS Sample Definition, for the definitions of low, medium, and high concentrations.

[2] Turnaround times are the maximum time allowed under the CLPAS contracts for laboratory submission of all reporting and deliverable requirements. Turnaround times for each sample are calculated from the day on which the sample is received at the CLP laboratory, as recorded on the shipper's delivery receipt and traffic report/chain-of-custody form.

[3] Low concentration for these services refers to the analytical quantitation limits for drinking water samples.

3.0 SAMPLE COLLECTION

3.1 Sample Definition

A CLP Analytical Services sample is defined by one sample matrix at one concentration level from one station location for each individual or set of analytical fraction(s), provided the fractions are all requested from the same CLP Analytical Service. CLP Analytical Services are generally used to analyze low and medium concentration samples. Low concentration samples are considered to be those samples collected in areas where immediate hazards are thought to be significantly reduced either by normal environmental processes or because of limited contamination. Medium concentration samples are most often those collected on-site in areas of moderate dilution by normal environmental processes. High concentration samples are considered to be those collected directly from drums, pits, ponds, lagoons, or areas where no dilution of waste is evident [these sample analyses are not available under current CLP Statements of Work]. For the most current definition of low or medium concentration please refer to the current CLP Statements of Work. The sampler must identify low, medium, and high concentration samples in the field in order to determine sample collection volume, packaging, and shipping procedures. CLP Analytical Services matrices can be water, soil or sediment. In some instances a mixed-matrix sample may be collected which contains either a supernatant (for a sediment/soil sample) or a precipitate (for a water sample). In those instances, it is best to discuss the required procedures with the TPO or APO. In general, two individual samples should be collected by separating the aqueous layer from the solid/precipitate layer at the point of collection is preferable.

A CLP Analytical Services sample consists of all sample aliquots (portions) from one station location, for one matrix, for one analytical program, for one laboratory necessary to collect appropriate volumes needed for the analysis of each fraction. One CLP Analytical Services sample may be contained in several bottles and vials. For example for the Low/Medium Organics CLP Analytical Service, one water sample might consist of all of the containers needed for the three analytical fractions available under this service (i.e., volatile fraction, semi-volatile fraction, and pesticide/Aroclor fraction), even though the fractions will be collected in separate containers. Therefore, the fractions of the CLP Analytical Service, along with the type of matrix and the expected concentration level (low/medium or high level), determine container type and volume.

As an example, let's say you are sampling at Leroy's Pond (see Exhibits 3.1 and 3.2). *You are instructed to collect one low/medium concentration water sample and one low/medium concentration soil/sediment sample, each to be analyzed for all of the low/medium organic and inorganic fractions available through CLP Analytical Service.* According to CLP guidelines, each individual inorganic sample may be analyzed for total metals or dissolved metals, but not both. If you want data for both dissolved metals and total metals from the same station location, you must collect two separate samples and assign them each unique CLP sample numbers.

For the CLP Analytical Services Multi-Media, Multi-Concentration Inorganics (Low/Medium) contract, the analytical fractions of interest are total metals and cyanide. For the CLP Analytical Services Multi-Media, Multi-Concentration Organics (Low/Medium) contract, the analytical fractions of interest are volatiles, semivolatiles, and pesticides/Aroclors. In the future it will be possible to consider the Organic Low Concentration (water only) service.

Exhibit 3-1. Sampling at Leroy's Pond

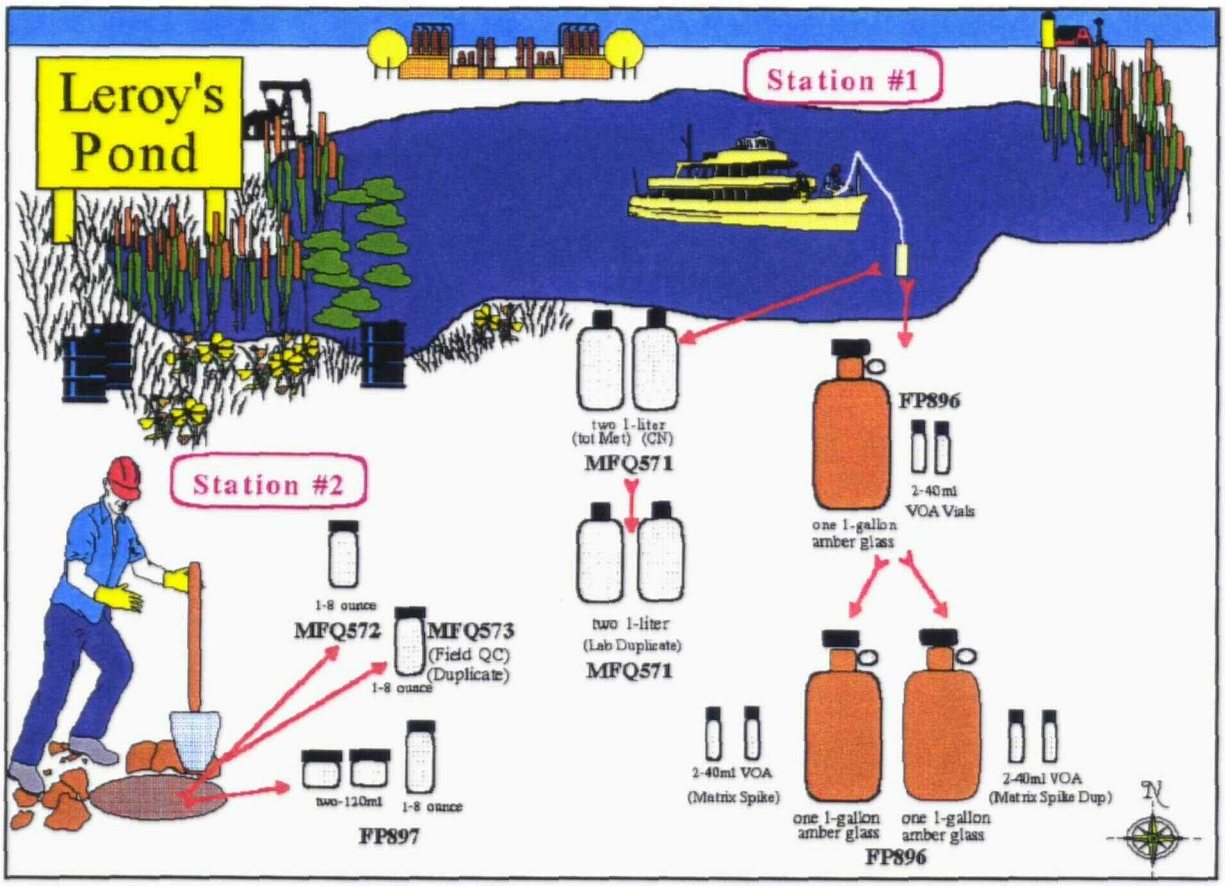


Exhibit 3-2. Table of Sampling at Leroy's Pond

MATRIX	LOW/MEDIUM ORGANICS	LOW/MEDIUM INORGANICS
Water	Volatiles Semivolatiles Pesticides/Aroclors	Total Metals Cyanide
Soil/Sediment	Volatiles Semivolatiles Pesticides/Aroclors	Total Metals Cyanide
Total number of samples collected = 4	2 organic samples (1 water + 1 soil/sediment)	2 inorganic samples (1 water + 1 soil/sediment)

Because you are collecting samples from two matrices for two analytical services, you must collect four separate samples: one water sample and one soil/sediment sample to be analyzed for CLP Analytical Services organics and one water sample and one soil/sediment sample to be analyzed for CLP Analytical Services inorganics. Note that a single sample may consist of several containers because each fraction and each concentration category require a certain volume for analysis.

3.2 CLP Analytical Services and Project Data Quality Objectives

Before requesting CLP Analytical Services, project managers should evaluate whether the services offered under the CLP are appropriate to meet the Data Quality Objectives (DQOs) [1] established for their project. This evaluation should take place during the planning stages of a sampling project and be documented in the Quality Assurance Project Plan (QAPP)[1] and/or the Sampling and Analysis Plan (SAP) [1].

The following specifications/features of CLP Analytical Services (this information is generally found in the Statement of Work for the analytical service) should be evaluated to determine the adequacy of the standardized services to meet the project DQOs:

- list of included target analytes/compounds
- sample concentrations covered
- required minimum sample volumes
- laboratory subsample size
- sample preparation and digestion methods
- analytical methods
- turnaround times
- Instrument Detection Limits
- Contract Required Quantitation/Detection Limits
- QA/QC requirements (e.g., identity, frequency, and acceptance criteria for laboratory QC samples)
- laboratory sample receipt and custody requirements
- data package deliverables (reporting requirements)

For example, the detection limits required to meet the project DQOs for some risk assessments might be lower than the Contract Required Detection Limits offered by the CLP. The standard CLP digestion and analytical methods might not be suitable for the sample matrix of interest. The CLP data turnaround times might be too long for some emergency response sampling projects. For situations such as the emergency response scenario, it is possible that a combination of CLP Analytical Services for the non time-critical analytes and alternative fast-turnaround services (14-day turn around time) for the time-critical analytes would be adequate to meet the project DQOs.

---

[1]For more information regarding QA and SAP planning and the DQO process, consult the documents listed in Section 9.0 of this guide.

If it is determined that CLP Analytical Services will not be adequate for all or some of the samples to be collected, alternatives should be explored. Each EPA Region may have developed analytical services options to supplement the laboratory services available nationally through the CLP. Contact the appropriate Regional analytical services representatives (usually the personnel listed in Section 7.0, Communications Network) for guidance in obtaining analytical services that will meet project DQOs.

3.3 References to CLP Laboratory Services in QAPPs and SAPs

QAPPs and SAPs typically contain sections describing analytical laboratory services. Standard, or boiler-plate, language is often used to describe laboratory requirements for procedures such as sample receipt and notification and laboratory participation in analyzing Performance Evaluation Samples (PESs). CLP contract specifications are designed to incorporate many of the most common good laboratory practice requirements, such as the requirement for laboratory Quality Management Plans (QMPs for further information see Section 9.0). If CLP Analytical Services will be requested for all or some of the samples covered in a QAPP and/or SAP, care should be taken to ensure that the QAPP/SAP descriptions of laboratory services for the CLP-destined samples are compatible with the CLP contract specifications. For example, CLP contracts do not allow CLP laboratories to contact samplers directly regarding problems with sample receipt. (Note that only the EPA Contracting Officer for the CLP has the authority to modify CLP contract specifications.) **It is generally the responsibility of the project manager to make sure that the project laboratory services requirements are communicated to the Regional analytical services representatives.**

QAPPs and/or SAPs also typically include standard operating procedures (SOPs) for procedures such as completing chain-of-custody forms, sample identification, and sample packaging and shipment. SOPs that will be used when collecting samples for analysis through the CLP should be reviewed before use to ensure that CLP requirements are accommodated. Many consultants' SOPs call for the site name to be provided on the form. However, for CLP Analytical Services samples, Case Numbers, rather than site names are used. SOPs associated with the collection of CLP samples should be reviewed before use to ensure that CLP requirements are accommodated.

In addition, QAPPs and SAPs specify such information as the analytical methods and laboratory QC requirements that will be used for samples. When CLP Analytical Services will be requested for samples, it is common for the QAPP or SAP to reference the appropriate CLP Statement of Work (SOW) for details such as the laboratory QC sample frequencies. There is often confusion regarding how to reference CLP SOWs, because several versions of a SOW for a particular analytical service, such as "Low/Medium Organics," may be active under contracts at the same time. Also QAPP and SAP authors do not control CLP laboratory assignments and will not know in advance which laboratory and corresponding SOW version will be assigned for their samples. Therefore, QAPP and SAP authors should refer to CLP SOWs as in the following example:

> "Low/medium concentration soil samples will be analyzed according to the specifications of the current EPA Superfund Contract Laboratory Program Statement of Work for Multi-Media, Multi-Concentrations Organics."

3.4 Sample Volume

The collection of proper sample volume is imperative to the success of sample analysis. If sufficient sample volume is not collected, the analysis of all required parameters and complete quality control determinations may not be possible. (See Section 3.6, Quality Control Samples.) Therefore, it is especially important to note the volume requirements for each specified. If adequate sample volume cannot be collected, notify the authorized RSCC or CLP Analytical Services Support personnel sample immediately. Note that more than one container may be required to provide the total volume of sample needed (e.g., two-40-ml glass vials for one volatile organic compound [VOC] analysis). Exhibits 3-3 and 3-4 specify the required sample volume and container type for each CLP Analytical Services fraction. Container type codes are detailed in Section 3.5, Sample Containers, and in Exhibit 3-5.

Exhibit 3-3. Low/Medium Organics Sample Volume

SAMPLE MATRIX	CONCENTRATION	FRACTION	LABORATORY QC SAMPLE VOLUME	MINIMUM SAMPLE VOLUME	CONTAINER TYPE[1]
Water	Low/Medium	Volatiles	4 each (40 mL)	2 each (40 mL)	B or D
		Semivolatiles	4 L	2 L	A,E,F,G,H,J, or K
		Pesticides/Aroclors	4 L	2 L	A,E,F,G,H,J, or K
Soil/ Sediment	Low/Medium [2]	Volatiles	4 each (40 mL)	2 each (40 mL)	D or B
		Semivolatiles	4 oz.	4 oz.	A,E,F,G,H,J, or K
		Pesticides/Aroclors	4 oz.	4 oz.	A,E,F,G,H,J, or K

1 Some sample containers may have small neck sizes and inhibit sampling efforts. See Exhibit 3.4 for container types.

2 All medium soil/sediment sample containers should be double contained before shipment (e.g., sample bottle/jar/vial placed in clean, lidded metal paint can). Consult DOT regulations for applicable shipping requirements.

Exhibit 3-4. Low/Medium Inorganics Sample Volume

SAMPLE MATRIX	CONCENTRATION	FRACTION	LABORATORY QC SAMPLE VOLUME	MINIMUM SAMPLE VOLUME	CONTAINER TYPE[1]
Water	Low/Medium	Total Metals	1L	1 L	A,C,E,F,G,H,J,K, or L
		Dissolved Metals	1L	1 L	A,C,E,F,G,H,J,K, or L
		Cyanide	1.5 L	1 L	A,C,E,F,G,H,J,K, or L
Soil/ Sediment	Low/Medium [2]	Total Metals	6 oz.	6 oz.	A,C,E,F,G,H,J,K, or L
		Cyanide	6 oz.	6 oz.	A,C,E,F,G,H,J,K, or L

1 Some sample containers may have small neck sizes and inhibit sampling efforts. See Exhibit 3.4 for container types

2 All medium concentration soil/sediment sample containers should be double contained before shipping (e.g., sample bottle/jar/vial placed in clean, lidded metal paint can). Consult DOT regulations for applicable shipping requirements.

3.5 Sample Containers

Exhibit 3-4 lists sample containers generally used during sample collection. Always use clean sample containers of an assured quality. For container cleaning procedures and additional container information, refer to the current iteration of *Specifications and Guidance for Contaminant-Free Sample Containers*, December 1992, OSWER Directive 92.0-05A. See Exhibits 3-3 and 3-4 for sample volume requirements. Samplers may wish to purchase pre-cleaned/quality assured bottles in lieu of cleaning their own bottles.

3.6 Quality Control Samples

QC samples are used to estimate the precision and accuracy of analytical results and to examine sources of error introduced by field and laboratory practices. A designated number of field QC samples may be included in each batch of samples which are sent to the CLP laboratory, as specified by the Sampling and Analysis Plan. A designated number of laboratory QC samples must be included in each batch of samples which are sent to the laboratory, as specified by

Exhibit 3-5 Sample Container Types

CONTAINER TYPE	SPECIFICATIONS
A	**Container:** 80-oz. amber glass, ring handle bottle/jug, 38-mm neck finish. **Closure:** Polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner.
B	**Container:** 40-mL glass vial, 24-mm neck finish. **Closure:** Polypropylene or phenolic, open-top, screw cap, 15-cm opening, 24-400 size. **Septum:** 24-mm disc of 0.005-in Teflon bonded to 0.120-in silicon for total thickness of 0.125-in.
C	**Container:** 1-L high density polyethylene, cylinder-round bottle, 28-mm neck finish. **Closure:** Polyethylene cap, ribbed, 28-410 size; F217 polyethylene liner.
D	**Container:** 120-mL wide mouth glass vial, 48-mm neck finish. **Closure:** Polypropylene cap, 48-400 size; 0.015-in Teflon liner.
E	**Container:** 16 oz. tall, wide mouth, straight-sided, flint glass jar, 63-mm neck finish. **Closure:** Polypropylene or phenolic cap, 63-400 size; 0.015-in Teflon liner.
F	**Container:** 8-oz. short, wide mouth, straight-sided, flint glass jar, 70-mm neck finish. **Closure:** Polypropylene or phenolic cap, 70-400 size; 0.015-in Teflon liner.
G	**Container:** 4-oz. tall, wide mouth, straight-sided, flint glass jar, 48-mm neck finish. **Closure:** Polypropylene or phenolic cap, 48-400 size; 0.015-in Teflon liner.
H	**Container:** 1-L amber, Boston round, glass bottle, 33-mm pour-out neck finish. **Closure:** Polypropylene or phenolic cap, 33-430 size; 0.015-in Teflon liner.
J	**Container:** 32-oz. tall, wide mouth, straight-sided, flint glass, 89-mm neck finish. **Closure:** Polypropylene or phenolic cap, 89-400 size; 0.015-in Teflon liner.
K	**Container:** 4-L amber glass, ring handle bottle/jug, 38-mm neck finish. **Closure:** Polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner.
L	**Container:** 500-mL high-density polyethylene, cylinder-round bottle, 28-mm neck finish. **Closure:** Polypropylene cap, ribbed, 28-410 size; F217 polyethylene liner.
M	**Container:** 120-mL wide mouth glass vial, 48-mm neck finish. **Closure:** Polypropylene cap, 48-400 size; 0.015-in Teflon liner.

the CLP contract. Because the amount and type of QC samples collected vary between Regions, always refer to Regional guidance. Note that the types and frequencies of field QC samples should always meet project DQOs.

Field QC samples may include field duplicate samples, trip blanks, equipment blanks, and field blanks. The field QC samples should be prepared (i.e., labeled, packaged, preserved, and shipped to the assigned laboratory) identically to the primary field samples, and should remain "blind" to the laboratory to ensure indiscriminate handling. Each *field* QC sample receives a separate sample number. See Section 5.0, Sample Documentation.

Laboratory QC samples include matrix spikes and matrix spike duplicates for organic samples and matrix spike and sample duplicates for inorganic samples. The laboratory QC sample is an additional volume of an existing sample required by the laboratory's contract; the additional volume must be supplied by the sampler (see exhibits 3-3 and 3-4). Samplers **should designate one sample per matrix per 20 samples as a "laboratory QC" sample.** If the sampler does not designate a sample as the "laboratory QC," then it is possible that the laboratory could select the blank as the QC or use the primary field samples to meet contract QC requirements. The laboratory use of primary field samples for QC analysis can detract from data quality and useability. For example, if a laboratory requires two liters of field sample to perform a requested analysis without QC, and the laboratory receives two liters of field sample to perform the requested analysis along with matrix spike and duplicate analyses, the laboratory may split the field sample using

one liter for the required analysis and one half liter each for the matrix spike and duplicate analyses. In doing so, th e laboratory will double the achievable sample quantitation limits, and possibly fail to meet project DQOs. Samplers should label the laboratory QC sample containers and corresponding paperwork as "lab QC" as described in Section 5.4, Traffic Report/Chain-of-Custody Forms. Remember that the laboratory QC sample is not an additional sample and does not receive its own unique sample number. Exhibit 3-6 explains some of the types of QC samples that may be collected. Follow volume requirements as specified in Section 3.4, Sample Volume.

3.7 Duplicate and Split Samples

Duplicate samples may be collected to determine the variability of the sampling process. Duplicate samples should b e collected simultaneously from the same source and under identical conditions as the original sample. Aqueous duplicate samples are collected from successive volumes from the same sample source and device (e.g., bailers). Soil duplicates are collected from the same sample source and device.

Split samples may be collected to measure the variability between laboratories. The sample should be collected b y separating one sample into two or more sample containers. Aqueous split samples should be collected by either obtaining consecutive sample volumes from the same bailer or mixing the volumes in a large intermediate vessel, a s appropriate, depending on the nature of contaminants and Regional guidance. When collecting aqueous samples wit h devices, such as a bailer, for example, the following guidance should be followed. If more than one bailer is required to obtain the required sample volume, the first half volume of the first bailer should be poured into the first container, and the second half volume of the first bailer should be poured into the second container.

The first half volume of the second bailer should be poured into the second container, and the second half volume of the second bailer should be poured into the first container. This filling sequence should continue until both containers are filled. Please note that when sampling for VOC analysis, more than one bailer should not be used and sample mixing should be avoided because these procedures may increase analyte loss due to evaporation. Refer to Section 4.2.1, Volatile Organic Compound Collection, for guidelines on collecting samples for VOC analysis. When split samples are collected using an intermediate vessel, continually stir the contents of the intermediate vessel with a clean pipette or precleaned Teflon rod, and allow the contents to be alternately siphoned into respective sample containers using Teflon tubing. Any device used for stirring, or tubing used for siphoning, must be cleaned in the same manner as other equipment. Since a true split for sediment, sludge, and soil samples is not feasible under field conditions, a split soil sample should be considered a duplicate.

3.8 Performance Evaluation Samples

A Performance Evaluation Sample (PES) is a specially prepared Quality Control sample which is used to evaluate a laboratory's analytical proficiency. Most of the Organic PESs are supplied in ampules while most of the Inorganic PESs are supplied in plastic bottles. The frequency of use and the type(s) of PES(s) to be used during a sampling event should be specifically addressed in the Sampling and Analysis Plan. The availability and use of PESs should be coordinated through the Regional RSCC and/or TPO contact.

3.9 Recommendations for CLP Analytical Services Sample Preservation and Holding Times

Sample Preservation

Some water samples must be chemically preserved before shipment to the laboratory. All low concentration samples should be cooled to 4 ° ± 2 °C. Samples should be preserved and cooled immediately upon sample collection. Preservation techniques vary among the Regions; so use the information in Exhibit 3-7 as general guidance for properl y preserving samples. Contact your RSCC for Region-specific instructions.

Exhibit 3-6 QC Samples

QC SAMPLE	SAMPLE TYPE	PURPOSE	COLLECTION[1]	SAMPLE NUMBER
Field QC Samples	Field Duplicate[2]	To check reproducibility of laboratory and field procedures. To indicate matrix non-homogeneity.	Collect from areas that are known or suspected to be contaminated. Collect one sample per week or 10% (Regions may vary) of all field samples per matrix, whichever is greater.	Assign two separate (unique) CLP sample numbers (i.e., one number to the primary sample and one to the duplicate). Submit blind to the lab.
	Field Blank	To check cross-contamination during sample collection, sample shipment, and in the laboratory. Also to check sample containers.	Collect for each group of samples of similar matrix per each day of sampling. Use water (demonstrated to be free of the contaminants of concern) for organics; use metal-free (deionized or distilled) water for inorganics.	Assign separate CLP sample numbers to the field blanks. Submit blind to the lab.
	Volatiles Trip Blank	To check contamination during sample handling and shipment from field to laboratory.	Collect one sample (water demonstrated to be free of the contaminants of concern) per each day of organics sampling. This sample is prepared off-site, before sampling commences, and placed in the cooler used to ship volatile samples.	Assign separate CLP sample numbers to the trip blanks. Submit blind to the lab.
	Equipment Blank or Rinse Blank	To check field decontam-ination procedures.	Collect when sampling equipment is decontaminated and reused in the field or when a sample collection vessel (bailer or beaker) will be used. Use blank water (water demonstrated to be organic-free, deionized or distilled for inorganics) to rinse the equipment, and collect this rinse water into the sample containers.	Assign separate CLP sample numbers to the equipment blanks. Submit blind to the lab.
Laboratory QC Samples[3]	Matrix Spike and Matrix Spike Duplicate	Required by laboratory's contract to check accuracy and precision of organic analyses.	Collect triple volume for one water sample per 20 water samples. The triple volume water sample should be collected in the first shipment of organics samples.	Assign the primary sample, extra volume, matrix spike and matrix spike duplicate the same CLP sample number. Label the extra volume "Lab QC."
	Matrix Spike and Lab Duplicate	Required by laboratory's contract to check accuracy and precision of inorganic analyses.	Collect double volume for one water sample per 20 water samples. The double water volume sample should be collected in the first shipment of inorganic samples.	Assign the primary sample, extra volume, spike and duplicate the same CLP sample number. Label the extra volume "Lab QC."

[1] Consult Regional guidance for field QC sample frequencies, laboratory QC sample frequencies are fixed in the CLP contracts.
[2] A true split for sediment, sludge, and soil samples (and other heterogeneous samples such as highly turbid waters) is typically not feasible under field conditions. A split of this type of sample should generally be considered a duplicate.
[3] No extra volume is required for the soil/sediment matrix; however, the sample to be used for laboratory QC must be designated on the TR/COC.

Holding Times

Samples should be shipped to scheduled CLP laboratories as soon as possible after collection. Daily shipment of samples to CLP laboratories is very important, whenever possible, because many samples are stable only for a short period of time following collection. The technical holding times listed in Exhibit 3-7 are the maximum lengths of time that samples may be held from the time of collection to the time of analysis and still be considered valid. Samples that exceed these holding times may not be valid, and re-sampling may be necessary. The contractual holding times in Exhibit 3-8 are holding times that the CLP laboratory must follow to comply with the terms of the contract and are described in the CLP Analytical Services SOW. Contractual holding times are the same or shorter than the technical holding times to allow for sample packaging and shipping.

Exhibit 3-7 Recommendations for Sample Preservation and Technical Holding Times

PARAMETER TYPE	MEASUREMENT	PRESERVATIVE	TECHNICAL HOLDING TIME	CONTRACT MANDATED HOLDING TIME
Metals	Dissolved	Filter on-site, HNO_3 to pH<2, Cool, 4 °C	6 Months [1]	180 Days[4]
	Suspended	Filter on-site, Cool, 4 °C	6 Months	180 Days[4]
	Total	HNO_3 to pH<2, Cool 4 °C	6 Months	180 Days[4]
	Chromium^{6+}	Cool, 4 °C	24 Hours	180 Days[4]
	Mercury Dissolved	Filter, HNO_3 to pH<2, Cool, 4 °C	28 Days	26 Days[4]
	Mercury Total	HNO_3 to pH<2, Cool, 4 °C	28 Days	26 Days[4]
Inorganics, Non-Metals	Alkalinity	Cool, 4 °C	14 Days	14 Days
	Carbon, Total Organic	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Chemical Oxygen Demand	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Chloride	None Required	28 Days	28 Days
	Cyanide	Cool, 4 °C, NaOH to pH>12, 0.6 g ascorbic acid [2]	14 Days [3]	12 Days
	Nitrogen Ammonia	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Nitrate plus Nitrite	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Phosphorus	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Solids, Total Dissolved	Cool, 4 °C	7 Days	7 Days
	Solids, Total Suspended	Cool, 4 °C	7 Days	7 Days
	Sulfate	Cool, 4 °C	28 Days	28 Days
	Anions by Ion Chromatography	Cool, 4 °C	28 Days	28 Days
Organics	Pesticides/Aroclors	Cool, 4 °C, pH 5-9	14 Days	Extract in 10 Days
	Semivolatiles	Cool, 4 °C, store in dark	Extract in 7 days	Extract in 10 Days
	Volatiles (preserved)	Cool, 4 °C, HCl to pH<2	14 Days	10 Days[4]

'Source: Adapted from EPA-600/4-82-055, Technical Additions to Methods for Chemical Analysis of Water and Wastes and *40 Code of Federal Regulations § 136. Table II --Required Containers, Preservation Techniques, and Holding Times. 1995.*

• These are recommendations for sample preservation and holding times for aqueous samples. No official technical holding times are specified for soils/sediments under Superfund. However, EPA-specified contractual holding times do apply to soil/sediments. See Section 4.2.1, Volatile Organic Compound Collection for recommended procedures for the collection, handling, and preservation of soil samples to minimize the loss of volatile compounds. Please check your CLP Analytical Services SOW for required preservatives and holding times.

1 Samples should be filtered immediately on-site before adding a preservative.

2 Only use ascorbic acid in the presence of residual chloride. See section 4.2.1.

3 Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment to determine if sulfide is present. If sulfide is present, it can be removed by adding cadmium nitrate powder until a negative spot test is obtained using lead acetate paper. The sample is filtered and then NaOH is added to pH>12.

4 Analysis Start Date minus Laboratory Receive Date .

4.0 GENERAL SAMPLING TECHNIQUES AND CONSIDERATIONS

4.1 General Sampling Techniques

This section provides information on guidance documents available for collecting CLP Analytical Services samples . Samples should be collected according to the approved site specific Quality Assurance Project Plan and the Samplin g Analysis Plan (EPA QA/R-5 "*EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*" and EPA Order 5360.1). This document does not define specific sampling procedures for the CLP Analytical Services because specific sampling protocols depend on individual site conditions, Regional requirements, and DQOs. Regions may have their own specific requirements for individual sampling programs, the Regions ar e responsible for generating Region-specific sampling SOPs. Information regarding surface water, sediment, soil an d groundwater sampling can be found in many documents including the following sources:

- *Compendium of ERT Surface Water and Sediment Sampling Procedures*, EPA/540/P-91/005.
- *Compendium of ERT Soil Sampling and Surface Geophysics Procedures*, EPA/540/P-91/006.
- *Compendium of ERT Groundwater Sampling Procedures*, EPA/540/P-91/007
- *Quality Assurance Sampling Plan for Environmental Response (QASPER) software, Version 4.1, ERT.*
- *Requirements for the Preparation of Sampling and Analysis Plans*, Draft, US Army Corps of Engineers. June 30, 1994. EM 200-1-3.

Other sources are available. This list is not exhaustive.

These documents, along with appropriate Regional guidance and procedures, should be consulted for detailed sampl e collection, preservation, handling and storing, equipment decontamination, and quality assurance/quality control procedures. When working with potentially hazardous materials, follow U.S. EPA and OSHA requirements, specific health and safety procedures, and Department of Transportation (DOT) requirements.

Regional sampling protocols and Regional QA guidelines should be consulted. Proper procedures for insuring goo d sampling results should be followed.

4.2 Special Sampling Considerations

This section provides general guidance for VOC, low concentration contaminant, and duplicate and split sample collection, along with procedures for sample compositing and mixing. The guidance provided in this section may be useful and appropriate for the collection of CLP Analytical Services samples.

The Regions should have developed specific SOPs to address the procedures for preserving samples in the field.

Testing and amelioration of carbonates, residual chlorine or oxidants in VOC samples and sulfides and residual chlorine in extractable fractions should be included in Regional guidance.

4.2.1 Volatile Organic Compound Collection

When collecting samples for VOC analysis, care should be taken to prevent analyte loss by evaporation. The followin g procedures are designed to minimize sample contamination and analyte loss during aqueous and non-aqueous VOC sample collection. Also, be sure to follow Regional guidance to ensure that proper prepreservation treatment i s accomplished (e.g., residual chlorine). See Technical Notes on Drinking Water Methods , EPA/600/R-94/173, page 53.

Aqueous VOC Sample Collection

- Rinse the vial with sample water prior to actual sample collection and preservation. See Section 3.8, Sample Preservation and Holding Times, and Exhibit 3-7.
- Avoid excessive aeration and agitation of the sample by pouring the sample slowly down the edge of the sample vial.
- Fill vial so that a reverse (convex) meniscus is present (in the case of water in a glass container).
- Place septum on the vial so that the Teflon side is in contact with the sample and then tighten the cap.
- Immediately invert the vial and lightly tap to locate air bubbles.
- If air bubbles are present, discard the sample and recollect the sample. Check the recollected sample for air bubbles. If air bubbles are present, additional sample water may be added to the vial in an attempt to eliminate the air bubbles. The presence of air bubbles after three consecutive attempts to rid the sample of the condition should result in the use of a new sample container and recollection of the sample. Regions vary in their approach to rinsing the sampling vial and recollecting the sample in the same vial. BE SURE TO FOLLOW REGIONAL GUIDANCE.
- Do NOT mix or composite samples.
- Immediately transfer the vial to the sample shuttle [device which contains a "set" of VOC vials] once it has been collected. Do not allow ice to touch the vials.

Solid VOC Sample Collection

- Minimize headspace as much as possible.
- Pack sample lightly with either a glass rod, Teflon spatula, or stainless steel spatula.
- Secure cap with Teflon-side of septum in contact with sample.
- Do NOT mix or composite samples.
- Immediately transfer the vial to the sample shuttle once it has been collected. Do not allow ice to touch the vials.
- Wipe outside of sample container to remove excess sample from threads to ensure a tight lid fit.

4.2.2 Contaminant Sampling

Some compounds can be detected in the ppb and/or ppt range. Extreme care must be taken to prevent cross-contamination of these samples. The following precautions should be taken when trace contaminants are of concern:

- Disposable gloves should be worn each time a different location is sampled.
- When collecting both surface water and sediments samples, surface water samples should be collected first. This reduces the chance of sediment dispersal into surface water, and the resulting loss of surface water sample integrity.

- Sampling should occur in a progression from the least to most contaminated area, if this information is known.

- Samplers should use equipment constructed of Teflon, stainless steel, or glass that has been properly precleaned for collecting samples for trace organics compound analyses. (A set of procedures for cleanin g sampling equipment may be found in Regional guidance. Equipment constructed of plastic or PVC should not be used to collect samples for trace organic compounds analyses.

4.2.3 Sample Compositing and Mixing

When compositing solid samples, (i.e., sediment, soil, sludge) for analysis of compounds present in trace quantities, a stainless steel or Teflon bowl and spatula should be used. Samples for VOC analysis should not be composited to minimize evaporation. The sample should be thoroughly mixed and divided into subsections in the compositing container. The procedure for sectioning is as follows:

- Roll the contents of the compositing container to the middle of the container and mix.

- Quarter the sample and move to the sides of the container.

- Mix each quarter individually and roll to the middle of the compositing container.

- Mix the sample once more, composite quarter subsamples, place in container.

The approximate quantity of each subsection should be recorded in the field logbook.

5.0 SAMPLE DOCUMENTATION

Each sample processed by the CLP must be properly documented to ensure timely analysis of all parameters requested and to support the use of the sample data in potential enforcement actions. **It is the sampler's responsibility to fill out all appropriate paperwork completely and correctly.** This section provides instructions for completing all CLP forms and other sample documentation. Each EPA Region may require additional documentation. It is important to follow both the national guidelines and Regional guidelines for CLP Analytical Services samples. Contact your RSCC for Region-specific instructions and guidance prior to the sampling activity. Contact the Region VII RSCC for informatio n regarding sample documentation for the Rapid Turnaround Dioxin Analytical Service.

5.1 Case Number/Sample Delivery Group

A Case number is assigned by the CLASS contractor to CLP Analytical Services sampling events and is five digits in length. Each CLP Analytical Services sampling event receives a distinct Case number which helps maintain sit e confidentiality. (Contract laboratories should not know the site name for the samples they are analyzing in order to avoid potential conflict of interest problems.) The Case number also enables the CLASS contractor and the Region to easily track CLP Analytical Services sampling events. The Sample Delivery Group (SDG) is a unit within a Case that is used to identify a group of samples for delivery. An SDG is defined as one of the following, whichever comes first: all samples with a Case, or every set of 20 field samples within a Case, or the field samples in a Case which are received at a laboratory during a specified period of time, beginning with receipt of the first sample in the Case or SDG. Note : Laboratory QC sample frequencies are based on the SDG.

5.2 Sample Number

The CLP sample number is a unique number that identifies each sample under a CLP Analytical Services analytical program. A CLP Analytical Services sample is defined by one sample matrix at one concentration level from one station location for each individual or set of analytical fraction(s), provided the fractions are all requested from the same CL P Analytical Service. The sample number is preprinted on adhesive labels and is provided by your RSCC, who routinel y orders them from the CLASS contractor. Exhibit 5-1 shows examples of CLP Analytical Service sample labels. Sample numbers are comprised of a Regional letter code and sequential sample numbering. Regional letter codes are listed i n Exhibit 5-2. Use only the labels provided to the Region in which you are sampling. **It is your responsibility to assign this critical sample number correctly and to transcribe it accurately on the appropriate documentation.** Place the label on the appropriate sample container and transcribe the sample number onto the sample tag and TR/COC (Tracking Report/Chain of Custody) form. The unique sample number must only be used for one sample. Destroy all unused labels to prevent duplication of sample numbers. Do not add digits or hyphens to the CLP sample numbers. If additional sample numbers are needed in the field, contact your RSCC. The sampler should consider placing clear tape over the adhesive labels as this procedure will help preserve the information on the adhesive labels. Samplers should attempt to use the provided CLP sample numbers in numerical order [as much as possible]. All samples must have sample numbers on the label and tag, if tags are used. The use of sample tags is highly recommended (see Section 5-3).

Organic Sample Numbers

Organic sample numbers are five characters long and have the format XXXXX. The first letter indicates the Region, the remaining letters and numbers are used for sequential sample numbering (see Exhibits 5-1 and 5-2). Organic sample numbers are preprinted on labels. For the organic fractions, there are ten labels four for semivolatiles (labeled extractables), two for volatiles, and four are blank (for pesticides/Aroclors and extra sample volume). Remember that the unique sample number must only be used for one sample. Destroy all unused labels to prevent duplication of sample numbers.

Inorganic Sample Numbers

Inorganic sample numbers are six characters long and have the format MXXXXX. The "M" indicates that this sample is inorganic, the second letter indicates the Region, and the remaining letters and numbers are used for sequential sample numbering (see Exhibits 5-1 and 5-2). Inorganic sample numbers are preprinted on labels, seven labels per strip. Tw o labels are for total metals, two for cyanide and three blanks (for extra sample volume). According to CLP guidelines, each individual inorganic sample may be analyzed for total metals or dissolved metals, but not both. That is, sample s collected for total metal and dissolved metal analyses must receive separate (unique) sample numbers. Remember that the unique sample number must only be used for one sample. Destroy all unused sample labels.

Exhibit 5-1. CLP Analytical Services Sample Labels

Organic

BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - VOA
BLH01 - VOA
BLH01 - Pesticide/Aroclor
BLH01 -
BLH01
[Blanks may be included]

Inorganic

MBJT01 - Total Metals
MBJT01 - Total Metals
MBJT01 - Cyanide
MBJT01 - Cyanide
MBJT01
MBJT01
MBJT01

[Blanks may be included]

Exhibit 5-2. CLP Analytical Services Regional Letter Codes

REGION	LETTER CODE	
	ORGANIC	INORGANIC
I	A	MA
II	B	MB
III	C	MC
IV	D	MD
V	E	ME
VI	F	MF
VII	G	MG
VIII	H	MH
IX	Y	MY
X	J	MJ

5.3 Sample Tag

To support the use of sample data in potential enforcement actions, samples should be identified according to EPA National Enforcement Investigations Center (NEIC) sample control guidelines. NEIC recommends that samples other than *in situ* measurements (e.g., pH, temperature, conductivity) be identified with a sample tag. Each sample aliquot removed from a hazardous waste site to be transferred to a laboratory for analysis should, therefore, be identified with a sample tag. The sample tag is returned to the Region by the laboratory along with the corresponding data package as physical evidence of sample receipt and analysis.

Check with your authorized requestor (RSCC or Project Manager, it will vary among the Regions) to determine the availability of and the specific requirements for sample tags. Tie a sample tag on each sample container. (See Section 6.0, Sample Packaging and Shipping for tying procedures.) Exhibit 5-3 is an example of a sample tag. Exhibit 5-4 contains instructions for completing a sample tag.
Section 6.1, Sample Packaging, contains additional information on sample tags

Exhibit 5-3. Sample Tag

Project Code 2	Station No. 3	Mo./Day/Year 4	Time 5	Designate: 6	
ZA5M10.0	26	8/9/91	10:07	Comp.	Grab x

Tag No. 7712

Station Location 7: MONITORING WELL #26 SPLIT SPOON #11

Sampler's (Signatures) 8: John Jones

Lab. Sample No.	Remarks:	Pesticides	VOA organics	ABN	Cyanide	Metals	Phenolics	COD, TOC, Nutrients	BOD Anions Solids (TSS) (TDS) (SS)	ANALYSES 10	Preservative: Y☒ N☐ 9
1	CASE NO. 1746 SAMPLE NO. MR501				x						

Exhibit 5-4. Sample Tag Instructions

STEPS	INSTRUCTIONS
STEP 1	Under the "Remarks" heading, record the CLP Case number and sample number.
STEP 2	Record the project code (e.g., contract number, work assignment number, Interagency Agreement number, etc.) assigned by EPA.
STEP 3	Enter the station number assigned by the sampling team coordinator.
STEP 4	Record the month, day, and year of sample collection.
STEP 5	Enter the military time of sample collection, e.g., 13:01 for 1:01 p.m.
STEP 6	Place an "X" to indicate composite or grab sample.
STEP 7	Record the station location (description) as specified in the project plan.
STEP 8	Sign the sample tag with your name.
STEP 9	Place an "X" in the box next to "yes" or "no" to indicate if a preservative was added to the sample.
STEP 10	Under "analyses," place an "X" in the box next to the parameters for which the sample is to be analyzed.
Note: Leave the box for "laboratory sample number" blank.	

5.4 Traffic Report/Chain-of-Custody Forms

The organic and inorganic traffic report/chain-of-custody (TR/COC) forms enable the CLASS contractor and the Region to track CLP Analytical Services samples and ensure that the samples are shipped to the appropriate contract laboratory. **The TR/COC form is functionally similar to a packing slip that accompanies a shipment of goods.** The TR/COC form includes a chain-of-custody record located at the bottom of the form. The form is used as physical evidence of sample custody. EPA-NEIC guidelines specify that official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. **The sampler is responsible for the care and custody of the sample until sample shipment.** A sample is considered to be in you r custody if any of the following criteria are met:

- The sample is in your possession or is in your view after being in your possession;
- The sample was in your possession and then locked up or sealed to prevent tampering; or
- You have placed the sample in a secured area.

Document CLP Analytical Services organic, inorganic samples on separate CLP TR/COC forms. TR/COC forms must be completed for every shipment of CLP Analytical Services samples to a contract laboratory. **Use indelible ink only, no pencil (a ball point pen is best)!** Make corrections by drawing a line through and initialing and dating the error, then enter the correct information. **Erasures are not allowed!** Each TR/COC form should be imprinted. Each TR/COC form documents up to 10 samples per Case number and sample shipment.

A separate TR/COC form must accompany each cooler for each daily shipment. The TR/COC forms must address al l samples in that cooler, but not address samples in any other cooler. This practice maintains the chain-of-custody for all samples in case of mis-shipment.

Instructions summarizing CLP sample volumes, packaging and reporting requirements are printed on the back of th e TR/COC forms.

Any errors on the TR/COC forms should be immediately reported to the authorized RSCC or CLASS personnel who can then inform the laboratory. The faster such problems are identified, the faster they can be corrected and critical delays in sample analysis may be avoided. See Section 7.0, Communication Network.

Exhibits 5-5, and 5-6 are examples of completed TR/COC forms. Exhibit 5-7 provides step-by-step instructions for filling out the organic and inorganic TR/COC forms. Exhibit 5-8 provides purpose codes for the forms. Samplers may find it helpful to carry these instructions to the field. Site managers should consider appending these instructions to the SAP.

After you have properly completed the TR/COC form, place the **bottom** two copies (white and yellow for organic and inorganic samples) in a plastic bag, then tape the bag to the inside of the sample cooler lid. The second copy (pink for organic and inorganic samples) must be returned to the CLASS contractor within five days of sample shipment. The address of the CLASS contractor is provided in Exhibit 7-3. The top copy (blue for organic and green for inorganic) should be sent to designated Regional personnel.

Note: **All samples in a cooler must be recorded on a TR/COC form inside the cooler and each unique sample number should be listed on only one TR/COC form.** (In the case where aliquots of the same sample are collected at different times [as may occur when well development is very slow] and shipped sequentially, fractions may be given different sample numbers. If fractions are given unique sample numbers, it will be necessary for the Region to track the fractions and maintain the knowledge that the fractions are from the same sample.) If all containers necessary for the analysis of 10 samples cannot fit into one cooler, divide samples into more coolers, making sure that all containers for each sample are in the same cooler. Place corresponding sample documentation into each cooler. **IF MORE THAN ONE TR/COC FORM IS USED FOR THE SAMPLES IN ONE COOLER**, then all of the forms must have complete header information and signatures.

5.5 Field Operations Records Management System

In an effort to streamline the resource intensive field documentation functions that occur during sampling activities, EPA-NEIC, at the request of the AOC, developed the Field Operations Records Management System II (FORMS II). FORMS II is software that facilitates the capture of field information during sampling events, and automates the production of bottle labels, sample tags, bottle-specific custody seals, chain-of-custody records, cooler seals, PRP sample receipt records, and field reports. FORMS II enables field personnel to download data to the laboratory, RSCC, and Regional users. FORMS II design features include the following:

Hardware portability/compatibility/versatility

Because field samplers cannot guarantee access to an AC power source or a stable computer working environment, FORMS II is compatible with existing portable hardware including portable computers, portable printers, and portable bar code scanning devices. While FORMS II is mouse-compatible, unknown field conditions prohibit FORMS II reliance on a mouse; but other pointing devices may be useful.

FORMS II uses hardware units specially selected to minimize the likelihood of failure or downtime as a result of adverse field conditions.

Bar code application

FORMS II uses bar code technology to accelerate the sample packing process for sample shipment to CLP laboratories. In addition, laboratory personnel may use the sample bottle bar codes to facilitate receipt and associated records management activities.

Flexibility for multiple samplers/samples

Field samplers and field sampling organizations often use unique numbering and identification schemes in addition to the CLP sample numbers when collecting samples. They also vary in their approach to many other activities. For that reason, FORMS II design includes choices for: identification scheme, activity names, labeling information, and number and types of labels/tags/seals.

Sample Definitions

FORMS II design is based on field sample, QC sample, and analytical fraction definitions that are consistent with those provided in Section 3.0, Sample Collection. FORMS II improves field time management, standardizes information management, and captures collection information in an electronic format early in the field sampling process. Estimated training time for new FORMS II users is less than two hours. FORMS II is currently managed by AOC. If you are interested in using FORMS II, please contact AOC at (703) 603-8870.

EPA — United States Environmental Protection Agency, Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analyses)

SAS No. (If Applicable) 1 | Case No. 2: 18025

1 Project Code: 21EM100 | Account Code: 41302 | 2 Region No: 1 | Sampling Co.: ACC | 4 Date Shipped: 8/10/92 | Carrier: FEDX 6

Regional Information 3 | Sampler (Name): JOHN SMITH 4 | Airbill Number: 123-456-7890 25

Non Superfund Program | Sampler Signature: John Smith | 5. Ship To 7: LAB A, 100 ARROW WAY, HOWE, VA 22141

Site Name: SAMS DUMP | 3. Purpose* 5: Lead — SF, PRP, ST, FED; Early Action — CLEM, PA, REM, RI, SI, ESI; Long-Term Action — FS, FD, RA, OSM, NPLD

City, State: BOSTON, MA | Site Spill ID: 22 | ATTN: SAMPLE CUSTODIAN

6. Matrix (Enter in Column A): 1 Surface Water, 2. Ground Water, 3. Leachate, 4 Field QC, 5 Soil/Sediment, 6. Oil (High only), 7 Waste (High only), 8. Other (Specify in Column A)

7 Preservative (Enter in Column D): 1 HCl, 2 HNO3, 3 NaHSO4, 4 H2SO4, 5 Ice only, 6 Other (Specify in Column D), N. Not preserved

CLP Sample Numbers (from airbill) 8	A Matrix (from Box 6) 9	O Conc.: Low Med High 10	C Sample Type: Comp/Grab 11	D Preservative (from Box 7) 12	F RAS Analysis: VOA	BN/A	Pest/PCB	High only: Metals ICP	G Region Specific Tracking Number of Airbill Numbers 14	H Station Location Identifier 15	I Mo/Day/Year/Time Sample Collection 16	J Corresponding CLP Inorganic Sample No 17	K Sampler Initials 18	L Field QC Qualifier 19
AFR23	7	L	G	1	X				A7717-A7713	MCL-MW-01	8/9/92 13:35	MACC22	gd	-
AFR24	7	L	G		X	X	X		A7714-A7717	MCL-SW-02	8/9/92 13:45	MACC23	gd	-
AFR25	6	L	G		X	X	X		A7718-A7721	MCL-SED-04	8/9/92 14:00	MACC24	gd	D
AFR26	2	L	G	1	X				A7722-A7723	MCL-MW-02	8/9/92 14:50	MACC25	gd	-

Shipment for Case Complete? (Y/N) 20: Y | Page 21: 1 of 1 | Sample(s) to be Used for Laboratory QC 22: AFR24; AFR25 | Additional Sampler Signatures 23 | Chain of Custody Seal Number(s) 24: 874327

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
26 John Smith	8/9/92 16:35				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-3

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

Exhibit 5-5. Organic TR/COC Form Example (Continued)

Organic Traffic Report/Chain of Custody Form Instructions

This form replaces both the individual Traffic Report and EPA Chain of Custody Record.

Water Samples	Required Volume	Container Type
Extractable Analysis (Low Level)	1 Gallon	4 X 1-Liter Amber Glass Bottle OR 2 X 80 oz. Amber Glass Bottle OR 4 X 1 Liter Amber Glass Bottle
Extractable Analysis	1 Gallon	32 oz. Wide-Mouth Glass Jars
Volatile Analysis (Low Level*)	80 mL	2 X 40-ml Glass Vials

Soil/Sediment Samples	Required Volume	Container Type
Extractable Analysis (Low or Medium Level*)	5 oz	1 X 8-oz. Wide Mouth Glass Jar OR
	240 mL	2 X 4-oz. Wide-Mouth Glass Jars
Volatile Analysis (Low or Medium Level*)		2 X 120 mL Wide-Mouth Glass Vials

*Soil VOA Vials under study, subject to change, check to ensure proper sealing

*All Medium and High Level Samples Must be Sealed in Metal Can for Shipment

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Extractable and Volatile Analysis	8 oz	1 X 8-oz. Wide-Mouth Glass Jar

1. Organic Sample Collection Requirements
- Please indicate which sample(s) are to be used for laboratory QC (Matrix Spike/Matrix Spike Duplicate).
- Ship medium and high concentration samples in metal cans.
- Aqueous samples require one triple-volume sample per twenty for Matrix Spike/Matrix Spike Duplicate.
- Oily samples can not be analyzed under the Contract Laboratory Program Analytical Services (CLPAS) program.

2. Cooler and Sample Documentation
- Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
- Please remember to complete the Chain of Custody information on the form.
- Seal the two sets of laboratory Traffic Report/Chain of Custody Form copies in a plastic bag. Include a return address and a method for returning the cooler. Tape bag under cooler lid.
- Seal each container in a plastic bag.
- Pack medium and high concentration samples in metal cans.
- Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
- Separate and surround cooler contents with vermiculite or equivalent packaging.
- Seal the cooler, overlapping the lid and body with custody seals.
- Mail CLASS the pink copy of the Traffic Report/Chain of Custody Form within 5 days.

3. Sample Shipment and Reporting
- All relevent Department of Transportation regulations must be followed when shipping samples.
- PHONE IN ALL SHIPMENTS IMMEDIATELY TO CLASS (or to RSCC, if instructed)

  Required information:
  - Case Number
  - Date shipped
  - Number of samples by concentration, matrix and analyses.
  - Carrier and airbill number
  - Next planned shipment

  Leave your name and a number where you can be reached.
- Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM (Eastern) the preceding FRIDAY.
- Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
- CALL IF YOU HAVE ANY QUESTIONS

  Contract Laboratory Analytical Services Support
  300 North Lee Street
  Alexandria, VA 22314
  Phone: (703) 519-1200
  FAX: (703) 519-8626

Purpose Codes

Lead		Early Action				Long-Term Action	
SF	= Superfund	CLEM	= Classical Emergency	SI	= Site Inspection	FS	= Feasibility Study
PRP	= Commercial Potentially Responsible Party	PA	= Early Action Preliminary Assessment	ESI	= Expanded Site Inspection	RD	= Remedial Design
ST	= State	REM	= Removal	RI	= Remedial Investigation	RA	= Remedial Action
FED	= Federal Facility					O&M	= Operation & Maintenance
						NPLD	= National Priorities List Deletion

★ U.S. GPO: 1988-864-781

Exhibit 5-6. Inorganic TR/COC Form Example

EPA United States Environmental Protection Agency Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record (For Inorganic CLP Analysis)

SAS No. (if applicable) 1

Case No. 18025 2

1. Project Code: 21 SM1 O 0 — Account Code: 41502 — 2. Region No. Sampling Co.: 1 ACE

Regional Information 3 — Sampler (Name): JOHN SMITH 4

Non-Superfund Program — Sampler Signature: John Smith

Site Name: SAM'S DUMP

City, State: BOSTON, MA — Site Spill ID: 1Z

3. Purpose: 5 — SF, PRP, ST, FED; CLEM, PA, REM, RI, SI, ES; FS, RD, RA, O&M, NPLD

4. Date Shipped: 8/5/92 — Carrier: FEDX 6

Airbill Number: 321-587-1390 25

5. Ship To: 7
LAB 2
100 APRIL WAY
BOSTON, MA 02109
ATTN: SAMPLE CUSTODIAN

6. Matrix (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (specify in Column A)

7. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2Cr_2O_7$ 6. Ice only 7. Other (specify in Column D) N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6)	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative (from Box 7)	E RAS Analysis		F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier
MAC022	2	L	G	2/3	X	X	A8711-A8712	MCL-MW-01	8/5/92 13:35	AF824	JS	
MAC023	2	L	G	2	X		A8713	MCL-MW-02	8/5/92 17:50	AF820	JS	–
MAC024	2	L	G	2/3	X	X	A8714-A8717	MCL-MW-03	8/5/92 14:25	AF825	JS	S
MAC025	2	L	G	2	X		A8718	MCL-MW-02	8/5/92 15:05	AF826	JS	
8	9	10	11	12	13		14	15	16	17	18	19

Shipment for Case Complete? (Y/N): Y 20 — Page 1 of 1 21 — Sample(s) to be Used for Laboratory QC: MAC024 22 — Additional Sampler Signatures 23 — Chain of Custody Seal Number: 571327 24

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
26 John Smith	8/5/92 15:35				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
SEE REVERSE FOR PURPOSE CODE DEFINITIONS

Exhibit 5-6. Inorganic TR/COC Form Example (Continued)

Inorganic Traffic Report/Chain of Custody Form Instructions

This form replaces both the individual Traffic Report and EPA Chain of Custody Record.

Water Samples	Required Volume	Container Type
Metals Analysis (Low Level)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Metals Analysis (Medium Level*)	16 oz.	1 X 16-oz. Wide-Mouth Glass Jar
Cyanide Analysis (Low Level)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Cyanide Analysis (Medium Level*)	16 oz.	1 X 16-oz. Wide-Mouth Glass Jar

Soil/Sediment Samples	Required Volume	Container Type
Metals and Cyanide (CN*) Analysis (Low or Medium Level*)	6 oz.	1 X 8-oz Wide-Mouth Glass Jar OR 2 X 4-oz. Wide-Mouth Glass Jars

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Metals and Cyanide* Analysis	6 oz.	1 X 8-oz Wide-Mouth Glass Jar

*All Medium and High Level Samples Must be Sealed in Metal Can for Shipment

1. Inorganic Sample Collection Requirements

- Please indicate which sample(s) are to be used for laboratory QC (Matrix Spike/Duplicate).
- Aqueous samples require one double-volume sample per twenty for laboratory Matrix/Spike Duplicate.
- Preserve low level water samples:

Total metals	Preserve with HNO_3 to pH ≤ 2
Dissolve metals	Preserve with HNO_3 to pH ≤ 2 after filtering through a 0.45 µm filter.
Cyanide	Preserve with 10 N NaOH to pH > 12

- Oily samples can not be analyzed under the Contract Laboratory Program Analytical Services (CLPAS) program.
- Ship medium and high concentration samples in metal cans.

2. Cooler and Sample Documentation

- Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
- Please remember to complete the Chain of Custody information on the form.
- Seal the two sets of laboratory Traffic Report/Chain of Custody Form copies in a plastic bag. Include a return address and a method for returning the cooler. Tape bag under cooler lid.
- Seal each container in a plastic bag.
- Pack medium and high concentration samples in metal cans.
- Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
- Separate and surround cooler contents with vermiculite or equivalent packaging.
- Seal the cooler, overlapping the lid and body with custody seals.
- Mail CLASS the pink copy of the Traffic Report/Chain of Custody Form within 5 days.

3. Sample Shipment and Reporting

- All relevent Department of Transportation regulations must be followed when shipping samples.
- PHONE IN ALL SHIPMENTS IMMEDIATELY TO CLASS (or to RSCC, if instructed)

  Required information:
  - Case Number
  - Date shipped
  - Number of samples by concentration, matrix and analyses.
  - Carrier and airbill number
  - Next planned shipment

  Leave your name and a number where you can be reached.
- Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM (Eastern) the preceding FRIDAY.
- Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
- CALL IF YOU HAVE ANY QUESTIONS

  Contract Laboratory Analytical Services Support
  300 North Lee Street
  Alexandria, VA 22314
  Phone: (703) 519-1200
  FAX: (703) 519-8626

Purpose Codes

Lead		Early Action				Long-Term Action	
SF	= Superfund	CLEM	= Classical Emergency	SI	= Site Inspection	FS	= Feasibility Study
PRP	= Commercial Potentially Responsible Party	PA	= Early Action Preliminary Assessment	ESI	= Expanded Site Inspection	RD	= Remedial Design
ST	= State	REM	= Removal	RI	= Remedial Investigation	RA	= Remedial Action
FED	= Federal Facility					O&M	= Operation & Maintenance
						NPLD	= National Priorities List Deletion

★ U.S. GPO: 1996-394-780

Exhibit 5-7. Organic and Inorganic Traffic Report/Chain-of-Custody Forms Instructions

STEP	INSTRUCTIONS
STEP 1	The SAS Order number is no longer applicable. Leave this box blank.
STEP 2	Record the Case number that has been assigned to the sampling event.
STEP 3	Transcribe the project codes and site information. Enter the project and account codes assigned to the project by the RSCCs or EPA Site Managers. Record the site name, city, state, and site spill ID (assigned by your Region). This part of the form is desensitized and will not print on the laboratory copies. All site information must be kept confidential.
STEP 4	Record your Region number and the name of your sampling company. Print your name and include your signature in the space following. Additional space for sampler signatures is provided for in the area designated as Step 23.
STEP 5	Place a check mark in the appropriate box for funding lead under the column labeled "Lead." Place another check mark under either the "Early Action" or "Long-Term Action" columns for sampling effort. Two boxes must be checked in this area. Note that RCRA is an example of a federal lead sampling activity. Purpose codes are described in Exhibit 5-8.
STEP 6	Record the date shipped, the carrier name (e.g., Federal Express, Purolator or Airborne) and the air bill number.
STEP 7	Record the name and full address of the contract laboratory. Enter the name of the sample custodian or CLP contact. If contact name is unknown, write "CLP Sample Custodian."
STEP 8	Transcribe the CLP sample number from the preprinted sample labels exactly as it appears. Do not add hyphens, extra zeros, characters, or digits.
STEP 9	Record the appropriate matrix code from the choices listed in box number 6 on the form. If the Region is shipping a quality control (QC) sample such as a field blank, coolant blank, trip blank, spike, duplicate, or performance evaluation sample, then "Field QC" should be entered as the matrix for that sample. *However, if the Region wishes to keep the QC sample blind to the laboratory [this is recommended], then the sampler should enter either "1," "2," or "3" for water QC samples, and "5" for soil/sediment QC samples as the matrix code in Column A, "Matrix."*
STEP 10	Enter the estimated sample concentration. For organic samples, enter "L" for low/medium aqueous samples, "L" for low concentration solid samples, and "M" for medium concentration solid samples. For inorganics, enter "L" for low concentration samples, "M" for medium concentration, and "H" for high concentration.
STEP 11	Enter the sample type, either composite or grab.
STEP 12	Record the type of preservative, using the codes from box number 7 on the form.
STEP 13	In the analysis columns, make a check mark for each fraction to be analyzed. (It is not necessary to write the number of sample containers used.) Organics fractions are volatiles, semivolatiles, and pesticides/Aroclors; Inorganic fractions are total metals, dissolved metals, and cyanide. For each individual inorganic sample, you may request either total metal or dissolved metal analyses, but not both. That is, samples collected for total metal and dissolved metal analyses must receive separate (unique) sample numbers. Note: Your form may also contain future or recently discontinued fraction analyses.
STEP 14	Transcribe the Region-specific tracking numbers or tag numbers designated by the RSCC. If possible, all tag numbers for each CLP sample should be on one line. If several tags with consecutive numbers are used for one sample, the first number must be completely transcribed. Remaining tag numbers in the sequence can either be represented by including only those numbers that are unique (separated by commas) or by listing the first and last numbers of the sequence, separated by a dash. The TR/COC form entries should make it clear which tag number corresponds to which fraction.
STEP 15	Enter the station location number.
STEP 16	Record the month, day, year, and time, in military style (e.g., 1600 hours = 4:00 p.m.), of sample collection. This may make field QC samples (e.g., duplicates) non-blind to the laboratory.
STEP 17	Enter the corresponding organic or inorganic CLP sample number, if applicable.
STEP 18	Enter your initials.

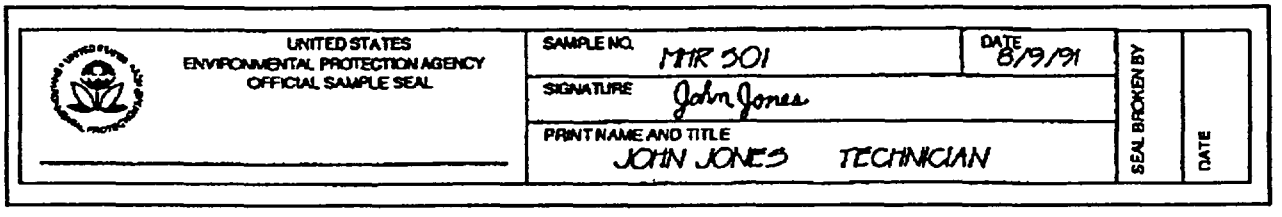
Exhibit 5-8. Purpose Codes

FUNDING ACTIVITY	CODE	DEFINITION
Funding Lead	SF	Superfund
	PRP	Potentially Responsible Party
	ST	State
	FED	Federal
Early Action	CLEM	Classic Emergency
	PA	Preliminary Assessment
	REM	Removal
	RI	Remedial Investigation
	SI	Site Inspection
	ESI	Expanded Site Inspection
Long-Term Action	FS	Feasibility Study
	RD	Remedial Design
	RA	Remedial Action
	O&M	Operations and Maintenance
	NPLD	National Priorities List Delete

5.6 Custody Seal

The custody seal is used to seal sample containers before they are placed into the cooler. Custody seals are also placed across the cooler opening after the cooler has been properly secured. The purpose of a custody seal is to indicate that the sample has not been tampered with prior to analysis. Therefore, for potential litigation purposes, you must sign and date the custody seal. It is a good practice to place the seal so that it is the signature that would be broken if the sample/cooler were opened (e.g., place the signature across the cooler/sample opening). Contact your authorized requestor or RSCC to obtain custody seals. Note: The space for "Sample No." does not need to be filled out on custody seals placed across the cooler opening. An example of a signed custody seal is shown in Exhibit 5-9. Because the use of custody seals varies between Regions, always refer to Regional guidance.

Exhibit 5-9. Custody Seal



6.0 SAMPLE PACKAGING AND SHIPPING

6.1 Sample Packaging

Follow all state and Federal regulations governing environmental sample packaging and shipment. Ship according to U.S. Department of Transportation (DOT) and International Air Transportation Association (IATA) regulations. The following sample packaging and shipping procedures need to be considered as minimum requirements. For some samples and shipping situations, these requirements may need to be exceeded.

- The site name should not appear on any documentation sent to the CLP laboratory.
- Aqueous samples for inorganic samples and volatile organic analysis may require chemical preservation. Note that the Regions may have slightly different requirements for the preservation of samples for volatile analysis, so Regional requirements should be consulted. Refer to Section 3.8, Sample Preservation and Holding Times, for these techniques before packaging.
- Check all lids/caps to make sure they are tight and will not leak. Place a completed custody seal over each container lid/cap, except for vials for volatile samples where the custody seal must be wrapped around the lid. (Note that the Regions may have slightly different requirements for placing custody seals and using tags, so Regional requirements should also be consulted. For custody seals, the objective is to place the seals in such a way that sample containers cannot be opened or tampered with without breaking the seal).
- Make sure sample labels are intact and covered with a piece of clear tape for protection. Tie on completed sample tags. Although there are no procedural requirements for tying on sample tags, a recommended approach is to tie the tag onto the sample bottle with a string by wrapping the string around the neck of the sample bottle and then tying the string into a knot.
- Enclose the sample container in clear plastic bag and seal the bag. Make sure the sample tags and labels are visible. See Exhibit 6-1. Note that if bubble wrap or other wrapping material will be placed around the labeled and tagged containers, write the sample number and fraction (e.g., "BLH01-VOCs") so that it is visible on the outside of the wrap, and then place the wrapped container in a clear plastic bag and seal the bag.
- Make sure that all samples that need to be kept cold (4+/-2°C) have been thoroughly cooled before placing in packing material so that the packing material serves to insulate the cold. Change the ice prior to shipment as needed. Ideally, pack the cooled samples into shipping containers that have already been chilled.
- Any soil/sediment samples suspected to be of medium/high concentration or containing dioxin must be enclosed in a metal can with a clipped or sealable lid (e.g., paint cans) to achieve double containment of those samples. Place suitable absorbent packing material around the sample container in the can. Make sure sample is securely stored in can and the lid is sealed. Label the outer metal container with the sample number and fraction of the sample inside. See Exhibit 6-1.
- Use a CLEAN waterproof metal or hard plastic ice chests or coolers in good repair for shipping samples. Remove the inapplicable previous shipping labels. Make sure any drain plugs are shut and seal plugs shut on the inside and outside with a suitable tape such as duct tape. Line the cooler with plastic (e.g., large heavy-duty garbage bag) before inserting samples.
- Ship samples at 4° +/- 2°C, place double-bagged ice on top of samples. Ice must be sealed in double plastic bags to prevent melting ice from soaking the packing material. Loose ice must <u>not</u> be poured into the cooler.

- It is good practice to conduct an inventory of sample numbers, fractions, and containers when placing samples into the coolers, and then check the inventory against the corresponding TR/COC form before sealing the cooler to make sure that all samples and containers are present.

- Pack the lined shipping containers with noncombustible, absorbent packing material such as vermiculite or rock wool. Place the packing material on the bottom of the shipping container (inside the plastic liner) and around sample bottles or metal cans to avoid breakage during shipment. Never use earth, ice, paper, or styrofoam to pack samples. Earth is a contaminant, melted ice may cause complications and allow the sample containers to bang together when the shipping container is moved, and styrofoam presents a disposal problem (it also may easily blow out of the shipping container at the site).

- For samples that need to be shipped at 4° +/-2°C, place double-bagged ice on top of samples and fill remaining space with packing material. Note that if sample bottles have been protected with packaging material such as bubble wrap, then some double-bagged ice or ice packs may also be placed between samples.

- Use tape to securely fasten the top of the plastic used to line the shipping container. It is a good idea to then place a completed custody seal around the top of the bag which contains the sample in case the outer seals placed across the cooler lid are inadvertently damaged during shipment.

- Enclose all sample documentation (i.e., TR/COC, other chain-of-custody forms, and cooler return shipping documents) in a waterproof plastic bag, and tape the bag to the underside of the cooler lid. See Exhibit 6-2. This documentation should address all samples in the cooler, but not address samples in any other cooler. If more than one cooler is being used, place separate sample documentation in each cooler.

- Instructions for returning the cooler should be documented inside the cooler lid. Write a return name and address for the sample cooler on the inside of the cooler lid in permanent ink to ensure return of the cooler.

- Tape the cooler shut using strapping tape over the hinges. Place completed custody seals across the top and sides of the cooler lid so that lid cannot be opened without breaking the seal. See Exhibit 6-3.

- Place clear tape over the seal to prevent inadvertent damage to the seal during shipment. Do not place clear tape over the seals in a manner that would allow the seals to be lifted off with the tape and then reaffixed without breaking the seal.

Exhibit 6-1. Sample Packaging

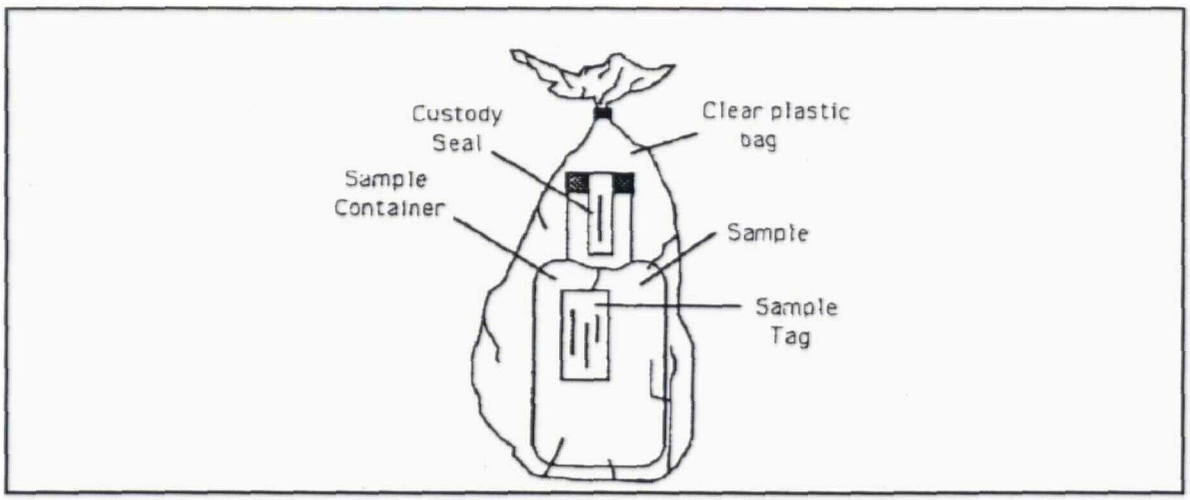


Exhibit 6-1a. Sample Packaging

Exhibit 6-2. Sample Cooler With Documentation

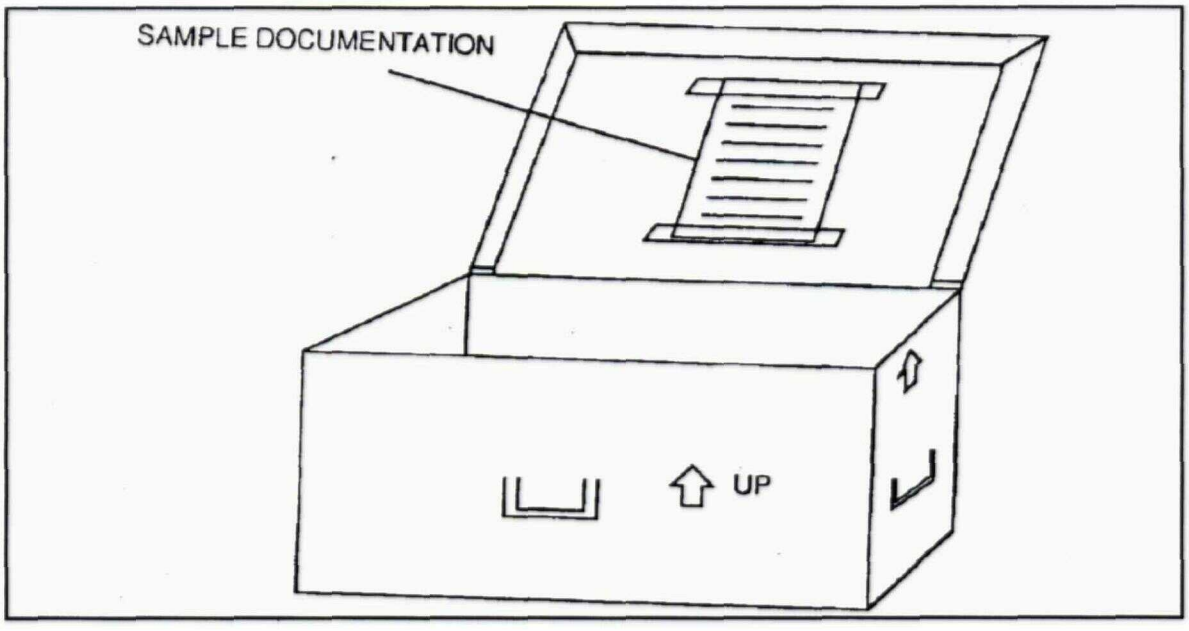


Exhibit 6-2a. Sample Cooler With Documentation

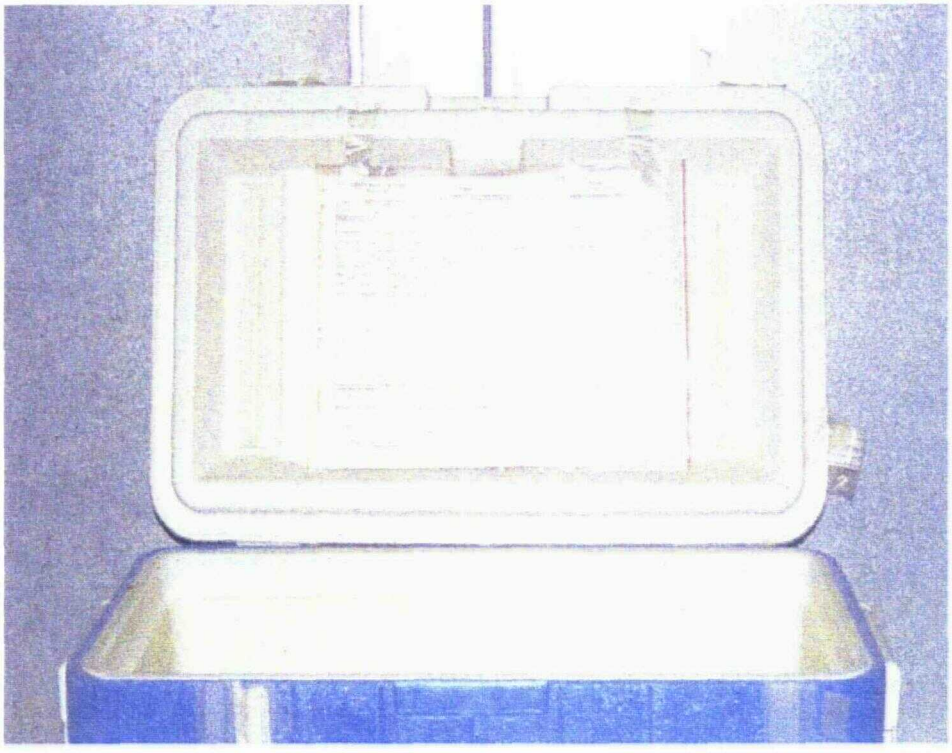
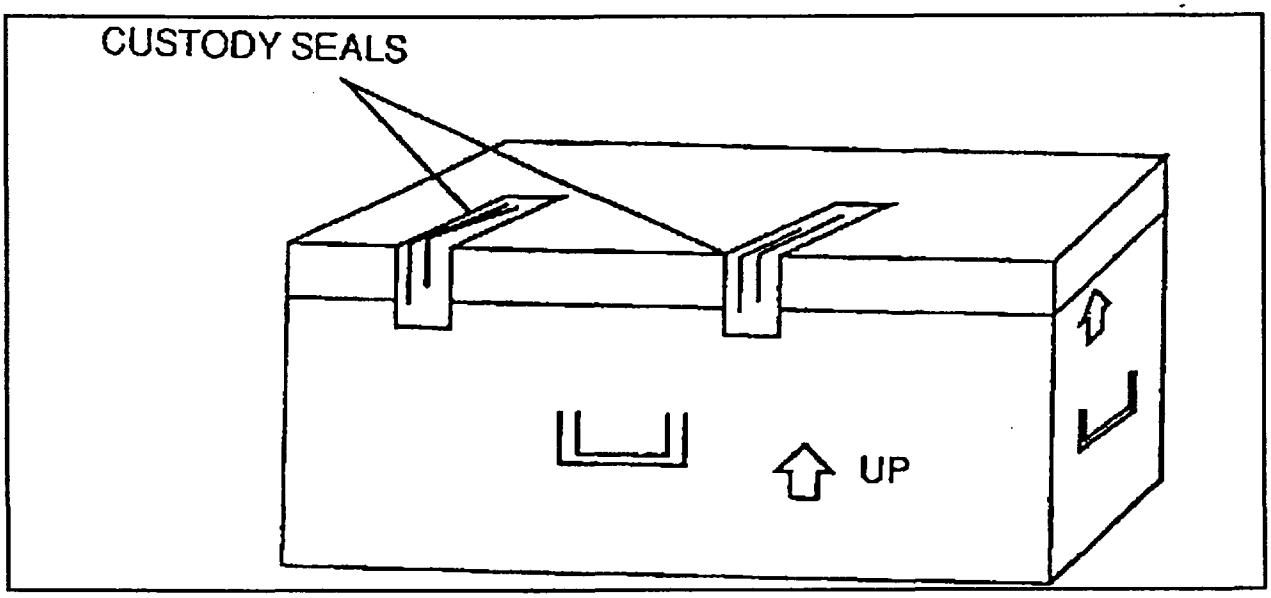


Exhibit 6-3. Sealed Cooler



6.2 Sample Shipping

Clearly label cooler and fill out appropriate shipping papers. Exhibit 6-4 shows the top of a cooler ready to be shipped.

- Place return address labels clearly on the outside of the cooler.
- If more than one cooler is being delivered to a laboratory, mark each cooler as "1 of 2," "2 of 2," etc. An air bill should be filled out for each cooler being shipped. When addressing the air bill to ship samples, identify the recipient as the "sample custodian."
- Ship samples through a commercial carrier, such as Federal Express, Purolator, or equivalent.
- Fill out all required government and commercial carrier shipping papers according to DOT and IAT A commercial carrier regulations.
- Ship all samples by overnight delivery, in accordance with DOT and IATA regulations.

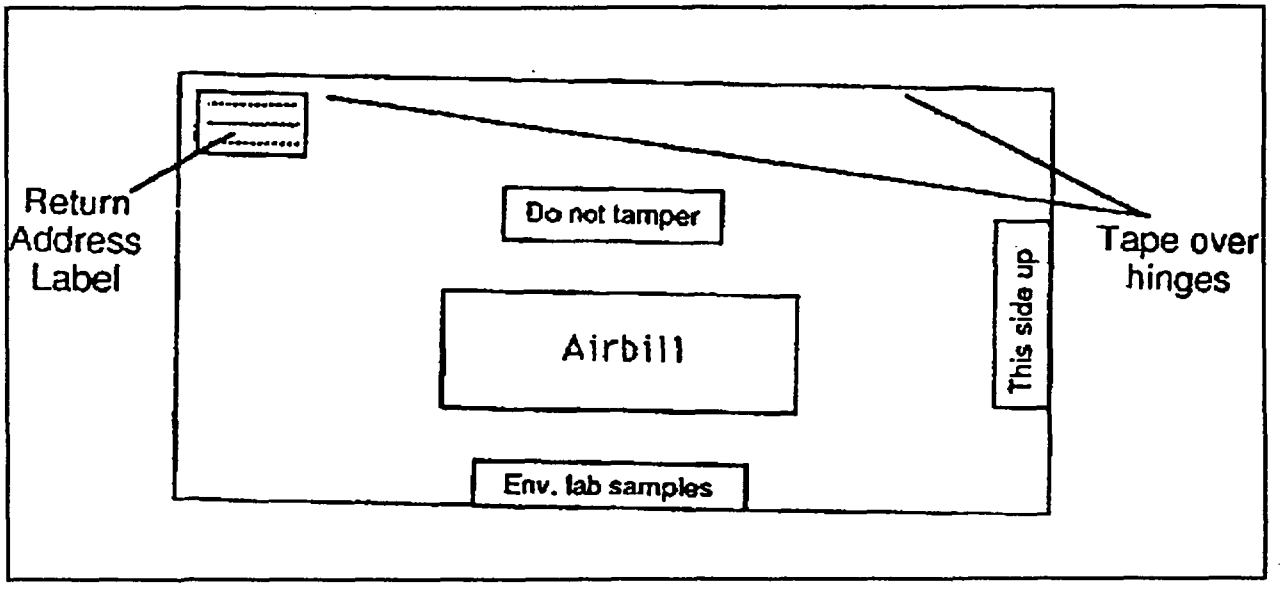
6.3 Potential Sampling Problems

Sometimes problems arise during sampling from improper sampling practices or other reasons. Some common problems to watch out for are:

- Filling out paperwork incorrectly or incompletely.
- Using the wrong Case number.
- Collecting less than the required sample volume.

- Shipping samples to the wrong laboratory.

Exhibit 6-4. Top of Cooler



- Assigning the same CLP sample number to dissolved and total metals water samples collected from the same location.
- Using incorrect sample containers.
- Improperly filling or packing sample containers.
- Preserving sample with incorrect preservative.
- Improperly labeling cooler.

These problems may delay sample analysis. If any of these problems occur, contact your RSCC or CLASS Coordinator immediately for instructions.

6.4 Reporting Sample Shipment

Notify the authorized RSCC or CLASS personnel, as directed, of all sample shipments on the day of shipment. This notification enables the CLASS contractor to track the shipment of samples from the field to the laboratory and ensures timely laboratory receipt of samples. When calling the CLASS contractor [General number: (703) 519-1200], provide the following information:

- Your name, phone number, and Region.
- Case number of the project.

- Exact number(s) of samples (not number of containers), matrix(ces) and concentration(s) of samples shipped. Type of analysis required.
- Laboratory(ies) to which samples were shipped.
- Carrier name and air bill number(s) for the shipment.
- Method of shipment (e.g., overnight, two day).
- Date of shipment.
- Suspected contaminants associated with the samples or site (e.g., dioxin, radio chemicals).
- Information on completions, changes, delays, continuations, etc., pertinent to the Case and sampling project.

Sample shipments made after 5 p.m. EST should be scheduled with the CLASS contractor at the start of business the next day (8 a.m. EST). **You must notify the CLASS contractor by 3 p.m. EST Friday for sample shipments that will be delivered on Saturday.** If the CLASS contractor cannot notify the laboratory of a Saturday delivery, there may not be anyone present at the CLP laboratory to receive samples until Monday.

6.5 Sample Cooler Returns

Regional and Regional Support Contractor Responsibilities

The EPA Regions and their support contractors are responsible for providing a mechanism for shipping empty sampl e coolers from the CLP laboratories back to the originating sampling office. AOC provides the following suggestions to maintain consistency among cooler transportation programs:

- Sampling contractors should include a completed shipping label in the cooler, which can have any code d information for tracking purposes.
- The label should consist of multi-copies so the laboratory and the sampling contractors can each retain one for their records.
- The label should be designed so that the laboratory can simply place the already-completed label on the cooler for shipment purposes.
- The label should include third-party billing information so that the transportation carrier is able to invoice the correct sampling contractor. The laboratory should be informed of the identity of the carrier.
- To avoid confusion, each Region should attempt to use only a minimum number of different carriers.
- Sufficient information should be included on the label to enable the sampling contractor to track use of the billing number.
- The process should be as easy as possible for the laboratories.

Laboratory Responsibilities

The laboratory is required to return sample coolers to the appropriate sampling office within 14 calendar days following shipment receipt. The laboratory should ensure that the account numbers provided by the Region are used only for the return of Government-owned shipping containers.

Laboratories are required to remove packing and other materials from the coolers before each pick-up and are required to ensure that the coolers are clean. Laboratories can determine from visual inspection if the coolers are clean. An authorized laboratory official is required to sign and telefax the pick-up records to the designated transportation contractor or sampler within two calendar days of cooler pick-up for return.

If laboratories do not follow the procedures, notify the TPO listed in Exhibit 7-1 for the Region where the laboratory is located.

7.0 COMMUNICATION NETWORK

This section provides Regional contacts for questions or concerns regarding CLP Analytical Services sampling and analysis. Exhibit 7-1 lists names and telephone numbers for Regional Technical Project Officers, who serve as the first line of contact for the laboratory for all technical problem resolution. Exhibit 7-2 gives names, addresses, and telephone numbers of Regional primary RSCCs. These contacts are available for CLP Analytical Services analytical requests and serve as the first contact for information regarding sampling. Exhibit 7-3 gives names, addresses, and telephone numbers of the CLASS Regional CLP Analytical Service contacts, who serve as a second contact for information regarding sampling. The RSCCs and CLASS coordinators can advise samplers regarding problems that occur in the field.

Exhibit 7-1. Regional Technical Project Officers

Region	Technical Project Officer	Telephone Number
Region I	Deb Szaro, Moira Lataille	(617) 860-4312
Region II	Pat Sheridan	(908) 906-6169
Region III	Stevie Wilding	(410) 573-6833
Region IV	Gary Bennett	(706) 546-3287
Region V	Brian Freeman	(312) 353-2720
Region VI	Ray Flores	(713) 983-2139
Region VII	Larry Marchin	(913) 551-5170
Region VIII	Steve Callio	(303) 312-7290
Region IX	Steve Remaley	(415) 744-1496
Region X	Bruce Woods	(206) 553-1193

Exhibit 7-2. RSCC Addresses and Contacts

Regional Sample Control Centers	Primary RSCC*
USEPA Region I, WMD 60 Westvoew Street Lexington, MA 02173	Christine Clark (617) 860-4615
USEPA Region II, ESD 2890 Woodbridge Ave. Bldg. 209, MS220 Edison, NJ 08837	Phil Guarraia (908) 321-6697
USEPA Region III, CRL 201 Defense Highway, Suite 200 Annapolis, MD 21401	Carolyn Sierra (410) 573-2755
USEPA Region IV, ESD Env. Compliance Branch College Station Road Athens, GA 30613	Bill Bokey (706) 546-3299
USEPA Region V, WMD 77 W. Jackson Blvd. (HSMC-5J) Chicago, IL 60604	Cecilia Luckett (312) 886-1488
USEPA Region VI, Laboratory 10625 Fallstone Road Houston, TX 77099	Myra Perez (713) 983-2130
USEPA Region VII, ESD 25 Funston Rd. Kansas City, KS 66115	Nicole Roblez (913) 551-5130
USEPA Region VIII, 8ES-MEB 999 18th St. 5th Floor Denver, CO 80202	Carol Beard (303) 312-6047
USEPA Region IX, OPM, P-3-2 75 Hawthorne St. San Francisco, CA 94105	Gail Jones (415) 744-1498
USEPA Region X, ESD 1200 Sixth Ave. (M/S ES-095) Seattle, WA 98101	Laura Castrilli (206) 553-4323/1795

* Primary RSCC assignments are subject to change.

Exhibit 7-3. CLASS CLP Analytical Services Coordinators [1]

Region	CLASS Regional Coordinator [2]	Telephone Number
Region I	Neil Rogers	(703) 519-1019
Region II	Neil Rogers	(703) 519-1019
Region III	Carol Shaeffer	(703) 519-1461
Region IV	Carol Shaeffer	(703) 519-1461
Region V	Mistie Llewellyn	(703) 519-1084
Region VI	Mistie Llewellyn	(703) 519-1084
Region VII	Mistie Llewellyn	(703) 519-1084
Region VIII	Carol Shaeffer	(703) 519-1461
Region IX	Neil Rogers	(703) 519-1019
Region X	Neil Rogers	(703) 519-1019

[1] The address for CLASS is Contract Laboratory Analytical Services Support, P.O. Box 818, Alexandria, VA, 22313. The phone number for CLASS is (703) 519-1200.
[2] The coordinator assignment is subject to change.

8.0 GLOSSARY

AOC: Analytical Operations Center. The U.S. EPA Center which directs the national Contract Laboratory Program.

APO: Administrative Project Officer. The APOs are part of AOC and monitor laboratory performance, initiate contract action and laboratory funding, help resolve problems, and develop and design analytical services and methods.

Aliquot: A measured portion of a sample taken for analysis. One or more aliquots make up a sample.

Case: A finite, usually predetermined number of samples collected over a given time period from a particular site. A Case consists of one or more sample delivery groups (SDGs). See sample delivery group.

Case number: Number assigned to a set of CLP Analytical Services samples by the CLASS contractor for trackin g purposes.

CLASS: Contract Laboratory Analytical Services Support. The contractor-operated CLASS office provides management, operations, and administrative support to the CLP. The CLASS contractor schedules sample shipment for CLP Analytical Services requests.

CLP: Contract L aboratory Program. The CLP provides analytical services to the 10 EPA Regions through contracte d commercial laboratories.

CLPAS: Routine CLP Analytical Services performed by laboratories that have been awarded CLP government contracts.

Concentration: Defined as high, medium, or low and used to determine how much volume is collected or the analytical protocol to be followed.

Data turnaround time: The maximum length of time allowed for laboratories to submit analytical data to EPA in order to avoid liquidated damages. Data turnaround time begins at the validated time of sample receipt (VTSR) at the laboratory.

DOT: Department of Transportation.

Fraction: A specific subunit of an analytical protocol. For example, for low/medium organics, the fractions are volatiles, semivolatiles, and pesticides/Aroclors.

FORMS II: FORMS II is software that facilitates the capture of field information during sampling events, and automates the production of bottle labels, sample tags, bottle-specific custody seals, chain-of-custody records, cooler seals, PRP sample receipt records, and field reports.

Headspace: Air pocket in a VOA vial.

Holding time: The maximum amount of time a sample may be stored before analysis.

IATA: International Air Transportation Association.

Matrix: The principal material of which the sample is composed of, usually water or soil/sediment for CLP Analytica l Services samples.

NEIC: National Enforcement Investigations Center, a part of EPA, which is supporting the Agency's enforcement program, located in Denver, Colorado.

Preservative: A chemical added to inorganic and volatile water samples to maintain the integrity of the sample. Some common preservatives include nitric acid, hydrochloric acid, and sodium hydroxide.

QC Samples: Samples used to estimate the precision and accuracy of analytical results in the field and in the laboratory.

RSCC: Regional Sample Control Center. The RSCC coordinates Regional sampling efforts.

Sample: A single, discrete portion of the environment collected from a specified physical location at a specific time. The single sample may be placed in multiple vessels. The aliquots are identified by the same sample number.

Sample container: The individual bottle that contains the sample or an aliquot of the sample. The type of sample container varies for different sample fractions and concentrations.

Sample custody: Legal possession of and responsibility for an EPA sample. Documentation of sample custody is maintained on the chain-of-custody part of the traffic report or packing list. The sample is in your custody if any of the following criteria are met: 1) the sample is in your possession or is in your view after being in your possession, 2) the sample was in your possession and then locked up or sealed to prevent tampering, or 3) you have placed the sample in a secured area.

Sample label: Adhesive labels distributed by the RSCC that provide the sample numbers to be assigned to the samples.

Sample number: The sample number from the sample label that identifies the sample or an aliquot of the sample.

SDG: The sample delivery group (SDG) is a unit within a Case that is used to identify a group of samples for delivery. An SDG is defined as one of the following, whichever comes first:

- all samples within a Case, or
- every set of 20 field samples within a Case, or
- all field samples in a Case which are received at a laboratory during a specified period of time, beginning with receipt of the first sample in the Case or SDG.

SOW: Statement of work. This document specifies how laboratories analyze samples under a particular CLP analytical program.

Station location: The specific location where samples are collected on a site.

TAL: Target Analyte List. TALs list the target analytes to test for in inorganic analyses.

TCL: Target Compound List. TCLs list the target compounds to test for in organic analyses.

TPO: Regional Technical Project Officer. The TPO monitors the activities of the contract laboratories located in his or her Region.

TR/COC: CLP Analytical Services Traffic Report/Chain of Custody form. This form is used to track CLP Analytical Services samples from sample collection to sample receipt by the laboratory.

Volume: The amount of sample collected. Volume requirements differ between CLP Analytical Services programs, matrices, fractions, and concentrations.

VOA: Volatile Organic compound Analysis. Used synonymously with VOC.

VOC: Volatile Organic Compound.

VTSR: Verified Time of Sample Receipt.

9.0 EPA REFERENCE DOCUMENTS

Copies of the EPA Reference documents may be obtained from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

U.S. EPA, "The Data Quality Objectives process for Environmental Decisions," QAMS EPA QA/G4.

U.S. EPA, "The Data Quality Objectives process for Superfund," EPA540-R-93-071.

U.S. EPA, "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," EPA QA/R5, Draft Interim Final, August 1994.

U.S. EPA, "EPA Requirements for Quality Management Plans," QAMS Interim Final, 8/94.

U.S. EPA, "User's Guide to the Contract Laboratory Program," EPA/540/P-91/002, 1991.

U.S. EPA, Compendium of ERT Surface Water and Sediment Sampling Procedures, EPA/540/P-91/005.

U.S. EPA, Compendium of ERT Soil Sampling and Surface Geophysics Procedures, EPA/540/P-91/006.

U.S. EPA, Compendium of ERT Groundwater Sampling Procedures, EPA/540/P-91/007.

U.S. EPA, Soil Sampling and Analysis for Volatile Organic Compounds, EPA/540/4-91/001.

U.S. EPA, Technical Notes on Drinking Water Methods, EPA/600/R-94/173.

Specifications and Guidance for Contaminant-Free Sample Containers, December 1992, OSWER Directive 92.0-05A.

Current CLP Statements of Work are available through NTIS and the CLU-IN Bulletin Board [System Operator at (301) 589-8368] on the Internet (via telnet) at CLU-IN.EPA.GOV.

US Army Corps of Engineers. Requirements for the Preparation of Sampling and Analysis Plans, Draft, June 30, 1994. EM 200-1-3.

APPENDIX C

Multi-Media, Multi-Concentration, Organic Analytical Service
for Superfund
Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-08FSC August 1999

EPA

Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (OLM03.2)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of volatile, semivolatile, and pesticide/Aroclor (pesticide/PCB) compounds that are analyzed using gas chromatography coupled with mass spectrometry (GC/MS) and gas chromatography with an electron capture detector (GC/ECD). The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of water and soil/sediment samples for organic compounds for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the organic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The organic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the isolation, detection, and quantitative measurement of 33 volatile, 64 semivolatile, and 28 pesticide/Aroclor (pesticide/PCB) target compounds in water and soil/sediment environmental samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. This service uses GC/MS and GC/ECD methods to analyze the target compounds. Two data delivery turnarounds are available to CLP customers: 35-day turnaround and 14-day turnaround after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages in the investigation of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET COMPOUNDS

The compounds for which this service is applicable and the corresponding quantitation limits are listed in **Table 1**. For water samples, the lowest quantitation limits reportable are 10 ppb for the volatile compounds, 10 ppb for the semivolatile compounds, and 0.05 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. For soil samples, the lowest quantitation limits reportable are 10 ppb for the volatile compounds, 330 ppb for the semivolatile compounds, and 1.7 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. Specific sample quantitation limits are highly matrix dependent. Compounds identified with concentrations below the quantitation limit are reported as estimated concentration values.

Table 1. Target Compound List and Contract Required Quantitation Limits (CRQLs) For OLM03.2*

		Quantitation Limits	
		Water (ug/L)	Low Soil (ug/Kg)
VOLATILES			
1.	Chloromethane	10	10
2.	Vinyl Chloride	10	10
3.	Bromomethane	10	10
4.	Chloroethane	10	10
5.	1,1-Dichloroethene	10	10
6.	Acetone	10	10
7.	Carbon Disulfide	10	10
8.	Methylene Chloride	10	10
9.	1,2-Dichloroethene (total)	10	10
10.	1,1-Dichloroethane	10	10
11.	2-Butanone	10	10
12.	Chloroform	10	10
13.	1,1,1-Trichloroethane	10	10
14.	Carbon Tetrachloride	10	10
15.	Benzene	10	10
16.	1,2-Dichloroethane	10	10
17.	Trichloroethene	10	10
18.	1,2-Dichloropropane	10	10
19.	Bromodichloromethane	10	10
20.	cis-1,3-Dichloropropene	10	10
21.	4-Methyl-2-pentanone	10	10
22.	Toluene	10	10
23.	trans-1,3-Dichloropropene	10	10
24.	1,1,2-Trichloroethane	10	10
25.	Tetrachloroethene	10	10
26.	2-Hexanone	10	10
27.	Dibromochloromethane	10	10
28.	Chlorobenzene	10	10
29.	Ethylbenzene	10	10
30.	Xylenes (total)	10	10
31.	Styrene	10	10
32.	Bromoform	10	10
33.	1,1,2,2-Tetrachloroethane	10	10
SEMIVOLATILES			
34.	Phenol	10	330
35.	bis-(2-Chloroethyl)ether	10	330
36.	2-Chlorophenol	10	330
37.	1,3-Dichlorobenzene	10	330
38.	1,4-Dichlorobenzene	10	330
39.	1,2-Dichlorobenzene	10	330
40.	2-Methylphenol	10	330
41.	2,2'-oxybis (1-Chloropropane)	10	330
42.	4-Methylphenol	10	330
43.	N-Nitroso-di-n-propylamine	10	330
44.	Hexachloroethane	10	330
45.	Nitrobenzene	10	330
46.	Isophorone	10	330
47.	2-Nitrophenol	10	330
48.	2,4-Dimethylphenol	10	330
49.	bis-(2-Chloroethoxy)methane	10	330
50.	2,4-Dichlorophenol	10	330
51.	1,2,4-Triclorobenzene	10	330
52.	Naphthalene	10	330
53.	4-Chloroaniline	10	330
54.	Hexachlorobutadiene	10	330
55.	4-Chloro-3-methylphenol	10	330
56.	2-Methylnaphthalene	10	330
57.	Hexachlorocyclopentadiene	10	330
58.	2,4,6-Trichlorophenol	10	330
59.	2,4,5-Trichlorophenol	25	830
60.	2-Chloronaphthalene	10	330
61.	2-Nitroaniline	25	830
62.	Dimethylphthalate	10	330
63.	Acenaphthylene	10	330
64.	2,6-Dinitrotoluene	10	330
65.	3-Nitroaniline	25	830
66.	Acenaphthene	10	330
67.	2,4-Dinitrophenol	25	830
68.	4-Nitrophenol	25	830
69.	Dibenzofuran	10	330
70.	2,4-Dinitrotoluene	10	330
71.	Fluorene	10	330
72.	Diethylphthalate	10	330
73.	4-Chlorophenyl-phenylether	10	330
74.	4-Nitroaniline	25	830
75.	4,6-Dinitro-2-methylphenol	25	830
76.	N-Nitrosodiphenylamine	10	330
77.	4-Bromophenyl-phenylether	10	330
78.	Hexachlorobenzene	10	330
79.	Pentachlorophenol	25	830
80.	Phenanthrene	10	330
81.	Anthracene	10	330
82.	Carbazole	10	330
83.	Di-n-butylphthalate	10	330
84.	Fluoranthene	10	330
85.	Pyrene	10	330
86.	Butylbenzylphthalate	10	330
87.	3,3'-Dichlorobenzidine	10	330
88.	Benzo(a)anthracene	10	330
89.	Chrysene	10	330
90.	bis-(2-Ethylhexyl)phthalate	10	330
91.	Di-n-octylphthalate	10	330
92.	Benzo(b)fluoranthene	10	330
93.	Benzo(k)fluoranthene	10	330
94.	Benzo(a)pyrene	10	330
95.	Indeno(1,2,3-cd)pyrene	10	330
96.	Dibenz(a,h)anthracene	10	330
97.	Benzo(g,h,i)perylene	10	330

		Quantitation Limits	
		Water (ug/L)	Soil (ug/Kg)
PESTICIDES/AROCLORS (PESTICIDES/PCBs)			
98.	alpha-BHC	0.05	1.7
99.	beta-BHC	0.05	1.7
100.	delta-BHC	0.05	1.7
101.	gamma-BHC (Lindane)	0.05	1.7
102.	Heptachlor	0.05	1.7
103.	Aldrin	0.05	1.7
104.	Heptachlor epoxide	0.05	1.7
105.	Endosulfan I	0.05	1.7
106.	Dieldrin	0.10	3.3
107.	4,4'-DDE	0.10	3.3
108	Endrin	0.10	3.3
109.	Endosulfan II	0.10	3.3
110.	4,4'-DDD	0.10	3.3
111.	Endosulfan sulfate	0.10	3.3
112.	4,4'-DDT	0.10	3.3
113.	Methoxychlor	0.50	17
114.	Endrin ketone	0.10	3.3
115.	Endrin aldehyde	0.10	3.3
116.	alpha-Chlordane	0.05	1.7
117.	gamma-Chlordane	0.05	1.7
118.	Toxaphene	5.0	170
119.	Aroclor-1016	1.0	33
120.	Aroclor-1221	2.0	67
121.	Aroclor-1232	1.0	33
122.	Aroclor-1242	1.0	33
123.	Aroclor-1248	1.0	33
124.	Aroclor-1254	1.0	33
125.	Aroclor-1260	1.0	33

* For volatiles, quantitation limits for medium soils are approximately 120 times the quantitation limits for low soils. For semivolatile medium soils, quantitation limits are approximately 30 times the quantitation limits for low soils.

The list of target compounds for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, compounds have been added to and deleted from the Target Compound List (TCL), based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

For drinking water and groundwater type samples, use of the low concentration organic analytical service is recommended.

METHODS AND INSTRUMENTATION

For semivolatile and pesticide/Aroclor (pesticide/PCB) water samples, a 1-L aliquot is extracted with methylene chloride using a continuous liquid-liquid extractor or separatory funnel (for pesticides/Aroclors (pesticides/PCBs) only)). For low level semivolatile soil and pesticide/Aroclor (pesticide/PCB) soil samples, a 30-g soil sample is extracted with methylene chloride/acetone. For medium level semivolatile soil samples, a 1-g soil sample is extracted with methylene chloride using sonication. For both water and soil samples, the extract is concentrated, subjected to fraction-specific cleanup procedures, and analyzed by GC/MS for semivolatiles or GC/ECD for pesticides/Aroclors (pesticides/PCBs).

For volatile water samples, 5 mL of water is added to a purge and trap device and purged with an inert gas at room temperature. For volatile low level soil samples, a 5-g aliquot of soil is added to a purge and trap device with 5 mL of reagent water and purged with an inert gas at 40°C. For volatile medium level soil samples, 4 g are extracted with methanol and an aliquot is added to reagent water. For both water and soil samples, the volatiles purged from the sample are trapped on a solid sorbent. They are subsequently desorbed by rapidly heating the sorbent and then introduced into a GC/MS system. **Table 2** summarizes the methods and instruments used in this analytical service.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy/ electronic data reporting forms and supporting raw data. The laboratory must submit data to EPA within 35 days (or 14 days for 14-day contracts) after laboratory receipt of the last sample in the set. EPA then processes the data through an automated Data Assessment Tool. DAT is a complete CLP data assessment package. DAT incorporates Contract Compliance Screening (CCS) and Computer-Aided Data Review and Evaluation (CADRE) review to provide EPA Regions with PC-compatible reports, spreadsheets, and electronic files within 24 to 48 hours from the receipt of the data for data validation. This automated tool facilitates the transfer of analytical data into Regional databases. In addition to the Regional electronic reports, the CLP laboratories are provided with a data assessment report that documents the instances of noncompliance. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then reviews the data for noncompliance and sends a final data assessment report to the CLP laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the implementation of the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC procedures required for this analytical service are shown in **Table 3**.

Table 2. Methods and Instruments

Fraction	Water	Soil
Volatiles	Purge and trap followed by GC/MS analysis	Purge and trap followed by GC/MS analysis
Semivolatiles	Continuous liquid-liquid extraction followed by GC/MS analysis	Sonication followed by GC/MS analysis
Pesticides/Aroclors (Pesticides/PCBs)	Continuous liquid-liquid or separatory funnel extraction followed by dual column GC/ECD analysis	Sonication followed by dual column GC/ECD analysis

Table 3. Quality Control

QC Operation	Frequency
System Monitoring Compounds (volatiles)	Added to each sample, standard, and blank
Surrogates (for semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Added to each sample, standard, and blank
Method Blanks (volatiles)	Analyzed at least every 12 hours for each matrix and level
Method Blanks (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Prepared with each group of 20 samples or less of the same matrix and level, or each time samples are extracted
Instrument Blank (volatiles)	Analyzed after a sample which contains compounds at concentrations greater than the calibration range
Instrument Blank (pesticides/Aroclors (pesticides/PCBs))	Every 12 hours on each GC column used for analysis
Storage Blanks (volatiles)	Prepared and stored with each set of samples
GC/MS mass calibration and ion abundance patterns (volatiles and semivolatiles)	Every 12 hours for each instrument used for analysis
GC Resolution Check (pesticides/Aroclors (pesticides/PCBs))	Prior to initial calibration, on each instrument used for analysis
Initial Calibration	Upon initial set up of each instrument, and each time continuing calibration fails to meet the acceptance criteria
Continuing Calibration	Every 12 hours for each instrument used for analysis
Internal Standards (volatiles and semivolatiles)	Added to each sample, standard, and blank
Matrix Spike and Matrix Spike Duplicate	Once every 20 or fewer samples of same fraction, matrix, and level

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and GC/MS tape audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

Terry Smith
Organic Program Manager
USEPA/AOC
401 M Street, SW (5204G)
Washington, DC 20460
703-603-8849
FAX: 703-603-9112

APPENDIX D

Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund

Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-09FSC August 1999

EPA

Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund (ILM04.0)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of inorganic analytes and cyanide that are analyzed using inductively coupled plasma (ICP), atomic absorption (AA), and colorimetric techniques. The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of water and soil/sediment samples for inorganic analytes for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the inorganic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The inorganic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the preparation, detection, and quantitative measurement of 23 inorganic target analytes and cyanide in water and soil/sediment environmental samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. This service uses inductively coupled plasma, atomic absorption, and colorimetric methods to analyze the inorganic target analytes and cyanide. Two data delivery turnarounds are available to CLP customers: 35-day turnaround and 14-day turnaround after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages in the investigation of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET ANALYTES

The analytes and detection limits for which this service is applicable are listed in **Table 1**. The list of target analytes for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, analytes have been added to and deleted from the Target Analyte List, based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program. Specific detection limits are highly matrix dependent.

METHODS AND INSTRUMENTATION

Table 2 summarizes the methods and instruments used in this analytical service.

Table 1
Target Analyte List and Contract Required Detection Limits (CRDLs) (ILM04.0)

Abbreviation	Analyte	Contract Required Detection Limit[1] (ug/L)
Al	Aluminum	200
Sb	Antimony	60
As	Arsenic	10
Ba	Barium	200
Be	Beryllium	5
Cd	Cadmium	5
Ca	Calcium	5000
Cr	Chromium	10
Co	Cobalt	50
Cu	Copper	25
Fe	Iron	100
Pb	Lead	3
Mg	Magnesium	5000
Mn	Manganese	15
Hg	Mercury	0.2
Ni	Nickel	40
K	Potassium	5000
Se	Selenium	5
Ag	Silver	10
Na	Sodium	5000
Tl	Thallium	10
V	Vanadium	50
Zn	Zinc	20
Cn	Cyanide	10

Sample concentration exceeding five times the detection limit of the instrument or method in use may be reported even though the instrument or method detection limit is greater than the CRDL. This is illustrated in the following example:

For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample Concentration = 220
Contract Required Detection Limit (CRDL) = 3

[1]The Contract Required Detection Limit is the instrument detection limit obtained in pure water.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy/ electronic data reporting forms and supporting raw data. The laboratory must submit data to EPA within 35 days (or 14 days for 14-day contracts) after laboratory receipt of the last sample in the set. EPA then processes the data through an automated Data Assessment Tool. DAT is a complete CLP data assessment package. DAT incorporates Contract Compliance Screening (CCS) and Computer-Aided Data Review and Evaluation (CADRE) review to provide EPA Regions with PC-compatible reports, spreadsheets, and electronic files within 24 to 48 hours from the receipt of the data for data validation. This automated tool facilitates the transfer of analytical data into Regional databases. In addition to the Regional electronic reports, the CLP laboratories are provided with a data assessment report that documents the instances of noncompliance. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then reviews the data for noncompliance and sends a final data assessment report to the CLP laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC procedures required for this analytical service are shown in **Table 3**.

Table 2. Methods and Instruments

Analyte	Instrument	Method
Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tl, V, Zn	Inductively Coupled Plasma (ICP)	Acid digestion followed by ICP analysis
As, Pb, Tl, Se	Graphite Furnace Atomic Absorption (GFAA)	Acid digestion followed by GFAA analysis
Ca, Mg, Na, K	Flame Atomic Absorption (FAA)	Acid digestion followed by FAA analysis
Hg	Cold Vapor Atomic Absorption (CVAA)	Acid and permanganate oxidation followed by CVAA analysis
CN	Manual and Semi-automated Colorimetric	Distillation followed by colorimetric analysis

Table 3. Quality Control

QC Operation	Frequency
Instrument Calibration	Daily or each time instrument is set up
Initial Calibration Verification	Following each instrument calibration
Initial Calibration Blank	Following each instrument calibration
Continuing Calibration Verification	Every ten analytical samples or every two hours during a run and at the beginning and end of each run
Continuing Calibration Blank	Every ten analytical samples or every two hours during a run and at the beginning and end of each run
Interference Check Sample	Every twenty analytical samples and at the beginning and end of each run
CRDL Standard for ICP	Every twenty analytical samples and at the beginning and end of each run
CRDL Standard for AA	At the beginning of each AA analytical run
Serial Dilution	For each matrix type and concentration for each sample delivery group (SDG)
Preparation Blank	For each sample preparation, analysis, and matrix per batch of prepared samples
Laboratory Control Sample	For each sample preparation and analysis procedure for each batch
Matrix Spike Sample Analysis	For each matrix type, concentration level, and method for each SDG
Duplicate Sample Analysis	For each matrix type, concentration level, and method for each SDG
Post Digestion Spike	Each time matrix spike recovery is outside QC limits
Analytical Spike	For each analytical sample analyzed by furnace AA
Method of Standard Addition	When the analytical spike recovery is outside QC limits
Instrument Detection Limit Determination	Quarterly
Interelement Corrections	Annually for ICP instruments only
Linear Range Analysis	Quarterly for ICP instruments only

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

Tanya Mitchell
Inorganic Program Manager
USEPA/AOC
401 M Street, SW (5204G)
Washington, DC 20460
703-603-8872
FAX: 703-603-9112

APPENDIX E

Low Concentration Organic Analytical Service for Superfund
(Water Matrix)
Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-32FSA August 1999

EPA

Low Concentration Organic Analytical Service for Superfund (Water Matrix) (OLC02.1)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of volatile, semivolatile, and pesticide/Aroclor (pesticide/PCB) compounds that are analyzed using gas chromatography coupled with mass spectrometry (GC/MS) and gas chromatography with an electron capture detector (GC/ECD). The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of groundwater and drinking water type samples for organic compounds for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the low concentration organic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The low concentration organic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the isolation, detection, and quantitative measurement of 41 volatile, 59 semivolatile, and 28 pesticide/Aroclor (pesticide/PCB) target compounds in low concentration groundwater and drinking water type samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. The data turnaround time for this contract is 14 days after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/ feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET COMPOUNDS

The compounds and quantitation limits for which this service is applicable are listed in **Table 1**. The lowest quantitation limits reportable are 1 ppb for the volatile compounds, 5 ppb for the semivolatile compounds, and 0.01 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. Specific sample quantitation limits are highly matrix dependent. The list of target compounds for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, compounds have been added to and deleted from the Target Compound List (TCL), based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

Table 1. Target Compound List and Contract Required Quantitation Limits (CRQLs) in ug/L (OLC02.1)

VOLATILES		
1.	Chloromethane	1
2.	Bromomethane	1
3.	Vinyl Chloride	1
4.	Chloroethane	1
5.	Methylene Chloride	2
6.	Acetone	5
7.	Carbon Disulfide	1
8.	1,1-Dichloroethene	1
9.	1,1-Dichloroethane	1
10.	cis-1,2-Dichloroethene	1
11.	trans-1,2-Dichloroethene	1
12.	Chloroform	1
13.	1,2-Dichloroethane	1
14.	2-Butanone	5
15.	Bromochloromethane	1
16.	1,1,1-Trichloroethane	1
17.	Carbon Tetrachloride	1
18.	Bromodichloromethane	1
19.	1,2-Dichloropropane	1
20.	cis-1,3-Dichloropropene	1
21.	Trichloroethene	1
22.	Dibromochloromethane	1
23.	1,1,2-Trichloroethane	1
24.	Benzene	1
25.	trans-1,3-Dichloropropene	1
26.	Bromoform	1
27.	4-Methyl-2-pentanone	5
28.	2-Hexanone	5
29.	Tetrachloroethene	1
30.	1,1,2,2-Tetrachloroethane	1
31.	1,2-Dibromoethane	1
32.	Toluene	1
33.	Chlorobenzene	1
34.	Ethylbenzene	1
35.	Styrene	1
36.	Xylenes (total)	1
37.	1,3-dichlorobenzene	1
38.	1,4-Dichlorobenzene	1
39.	1,2-Dichlorobenzene	1
40.	1,2-dibromo-3-chloropropane	1
41.	1,2,4-Triclorobenzene	1
SEMIVOLATILES		
42.	Phenol	5
43.	bis-(2-Chloroethyl)ether	5
44.	2-Chlorophenol	5
45.	2-Methylphenol	5
46.	2,2'-oxybis(1-Chloropropane)	5
47.	4-Methylphenol	5
48.	N-Nitroso-di-n-propylamine	5
49.	Hexachloroethane	5
50.	Nitrobenzene	5
51.	Isophorone	5
52.	2-Nitrophenol	5
53.	2,4-Dimethylphenol	5
54.	bis-(2-Chloroethoxy)methane	5
55.	2,4-Dichlorophenol	5
56.	Naphthalene	5
57.	4-Chloroaniline	5
58.	Hexachlorobutadiene	5
59.	4-Chloro-3-methylphenol	5
60.	2-Methylnaphthalene	5
61.	Hexachlorocyclopentadiene	5
62.	2,4,6-Trichlorophenol	5
63.	2,4,5-Trichlorophenol	20
64.	2-Chloronaphthalene	5
65.	2-Nitroaniline	20
66.	Dimethylphthalate	5
67.	Acenaphthylene	5
68.	2,6-Dinitrotoluene	5
69.	3-Nitroaniline	20
70.	Acenaphthene	5
71.	2,4-Dinitrophenol	20
72.	4-Nitrophenol	20
73.	Dibenzofuran	5
74.	2,4-Dinitrotoluene	5
75.	Diethylphthalate	5
76.	4-Chlorophenyl-phenylether	5
77.	Fluorene	5
78.	4-Nitroaniline	20
79.	4,6-Dinitro-2-methylphenol	20
80.	N-Nitrosodiphenylamine	5
81.	4-Bromophenyl-phenylether	5
82.	Hexachlorobenzene	5
83.	Pentachlorophenol	20
84.	Phenanthrene	5
85.	Anthracene	5
86.	Di-n-butylphthalate	5
87.	Fluoranthene	5
88.	Pyrene	5
89.	Butylbenzylphthalate	5
90.	3,3'-Dichlorobenzidine	5
91.	Benzo(a)anthracene	5
92.	Chrysene	5
93.	bis-(2-Ethylhexyl)phthalate	5
94.	Di-n-octylphthalate	5
95.	Benzo(b)fluoranthene	5
96.	Benzo(k)fluoranthene	5
97.	Benzo(a)pyrene	5
98.	Indeno(1,2,3-cd)pyrene	5
99.	Dibenz(a,h)anthracene	5
100.	Benzo(g,h,i)perylene	5
PESTICIDES/AROCLORS (PESTICIDES/PCBs)		
101.	alpha-BHC	0.01
102.	beta-BHC	0.01
103.	delta-BHC	0.01
104.	gamma-BHC (Lindane)	0.01
105.	Heptachlor	0.01
106.	Aldrin	0.01
107.	Heptachlor epoxide	0.01
108	Endosulfan I	0.01
109.	Dieldrin	0.02
110.	4,4'-DDE	0.02
111.	Endrin	0.02
112.	Endosulfan II	0.02
113.	4,4'-DDD	0.02
114.	Endosulfan sulfate	0.02
115.	4,4'-DDT	0.02
116.	Methoxychlor	0.10
117.	Endrin ketone	0.02
118.	Endrin aldehyde	0.02
119.	alpha-Chlordane	0.01
120.	gamma-Chlordane	0.01
121.	Toxaphene	1.0
122.	Aroclor-1016	0.20
123.	Aroclor-1221	0.40
124.	Aroclor-1232	0.20
125.	Aroclor-1242	0.20
126.	Aroclor-1248	0.20
127.	Aroclor-1254	0.20
128.	Aroclor-1260	0.20

If the compound concentration for water samples other than low concentration groundwater and drinking are suspected of containing higher than 25 ug/L, then it is recommended that the sampler use the multi-media, multi-concentration organic analytical service.

PREPARATION METHODS AND INSTRUMENTATION

For semivolatile and pesticide/Aroclor (pesticide/PCB) water samples, a 1-L aliquot is extracted with methylene chloride using continuous liquid-liquid extraction or separatory funnel (for pesticides/Aroclors (pesticides/PCBs) only). The extract is concentrated, subjected to fraction-specific cleanup procedures, and analyzed by GC/MS for semivolatiles or GC/ECD for pesticides/Aroclors (pesticides/PCBs). For volatiles, 25 mL of water is added to a purge and trap device and purged with an inert gas at room temperature. The volatiles purged from the sample are trapped on a solid sorbent. They are subsequently desorbed by rapidly heating the sorbent and then introduced into a GC/MS system. **Table 2** summarizes the preparation methods and instruments used in this analytical service.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy data reporting forms and supporting raw data. The laboratory must submit data to EPA within 14 days after laboratory receipt of the last sample in the set. EPA then checks the data for compliance with contract requirements. A report of instances of noncompliance is distributed to the

laboratory and the Region within 10 days from the receipt of the data. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then screens the data and sends a final data assessment report to the laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the implementation of the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC requirements for this analytical service are shown in **Table 3**.

Table 2. Preparation Methods and Instruments

Fraction	Preparation Method	Analytical Instrument
Volatiles	Purge and trap	GC/MS analysis
Semivolatiles	Continuous liquid-liquid extraction	GC/MS analysis
Pesticides/Aroclors (Pesticides/PCBs)	Continuous liquid-liquid or separatory funnel extraction	GC/ECD analysis

Table 3. Quality Control

QC Operation	Frequency
System Monitoring Compound (volatiles)	Added to each sample, standard, and blank
Method Blanks (volatiles)	Analyzed at least every 12 hours
Method Blanks (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Prepared with each group of 20 samples or less, or each time samples are extracted
Instrument Blank (volatiles)	Analyzed after a sample which contains compounds at concentrations greater than the calibration range
Surrogates (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Added to each sample, standard, and blank
Instrument Blank (pesticides/Aroclors (pesticides/PCBs))	Every 12 hours on each GC column used for analysis
Storage Blank (volatiles)	Prepared and stored with each group of samples
GC/MS mass calibration and ion abundance patterns (volatiles and semivolatiles)	Every 12 hours for each instrument used for analysis
GC Resolution Check (pesticides/Aroclors (pesticides/PCBs))	Prior to initial calibration on each GC column used for analysis
Initial Calibration	Upon initial set up of each instrument, and each time continuing calibration fails to meet the acceptance criteria

Table 3. Quality Control (Continued)

QC Operation	Frequency
Continuing Calibration	Every 12 hours for each instrument used for analysis
Internal Standards (volatiles and semivolatiles)	Added to each sample, standard, and blank
Laboratory Control Sample (LCS)	Prepared and analyzed with each group of 20 samples or less
Laboratory Evaluation Sample	Prepared and analyzed (if provided) with each set of 20 samples or less

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and GC/MS tape audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

Terry Smith
Organic Program Manager
USEPA/AOC
401 M Street, SW (5204G)
Washington, DC 20460
703-603-8849
FAX: 703-603-9112

APPENDIX D

Site Reconnaissance Checklist

SITE RECONNAISSANCE CHECKLIST

I. General
   1. Name and title of site contact.
   2. Telephone number.
   3. Site address.
   4. Mailing address (if different).
   5. Name of owner and/or operator.
   6. Mailing address.

II. Site History
   1. How long has current owner/operator been at site?
   2. What were previous uses of site? Who were previous owners?
   3. Size of site (acres).
   4. Is any other property used that is not contiguous with site?
   5. Permits (RCRA, TDH, etc.)
   6. Any past spills or other environmental or accident problems.
   7. What were previous waste management practices?

III. Current Operations
   1. What is currently being done at facility?
   2. What are waste management practices?
   3. What are hazardous chemical management practices?
   4. List major hazardous chemicals/constituents present and past.
   5. Discuss sources (e.g., tanks, impoundments, containers, etc.).
   6. Number of employees - current, peak.

IV. Source Characteristics
   1. Identify type of wastes and quantities disposed of at site.
      a. Identify source of information.
      b. Photograph.
      c. Dimension (quantity, volume, area) of waste locations.
      d. Containment controls (clay cap, clay liner, vegetative cover, etc.)
      e. Existing data.
      f. Condition/integrity of storage/disposal units.

Site Reconnaissance Checklist, continued

V. Groundwater Pathway

1. Distance from source to nearest well. Identify name and address of well owner, if possible - and estimate well usage (number of people served, irrigation, supplemental, etc.).
2. Verify wells within range of site. Indicate depth to water for each well and number of people served. Identify as many owners and addresses as practically feasible.
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
3. Aquifer nearest wells are screened in, and water quality.

VI. Surface Water Pathway

1. Identify the TNRCC Basin and Stream Segment where the site is located.
2. Describe surface water quality including:
   a. average discharge,
   b. total basin drainage area,
   c. TNRCC surface water quality monitoring stations.
3. Are there surface water bodies within 2 miles of site?
4. Provide sketch of surface water runoff and flow patterns for 15 stream-miles downstream.
5. identify intakes along surface water route within 15 stream-miles downstream.
6. What is water use at each intake.
7. Identify fisheries along the 15 stream-mile downstream pathway.
8. Identify sensitive environments along the 15 stream-mile downstream pathway (see attached list).
9. Identify downstream recreational uses.
10. Estimate approximate flow rates for each water body within the 15 stream-mile target distance (i.e., <10 cfs, 10-100 cfs, 100-1,000 cfs, 1,000- 10,000 cfs, etc.). Estimate length of each stream segment.
11. Identify the annual rainfall and net rainfall at the site.
12. Is site in flood plain (10 year, 100 year, 500 year)?
13. Estimate upgradient drainage area limits (watershed).
14. Draw a sketch of drainage from site to nearest surface water including any other contributing tributaries.
15. Identify recreational uses downstream (15 miles).

Site Reconnaissance Checklist, continued

VII. Soil Exposure Pathway

1. Describe status of site access, fencing, gates, locks, condition of security controls.
2. Describe adjacent land use.
3. Describe off-site runoff patterns.
4. Describe number of people with residence, school, or day care on-site or within 200 yds.
5. Locate nearest school or day care.
6. Number of workers on-site (include maximum number to cover work on-site).
7. Evidence of recent human activity at the site.
8. Identify sensitive environments, (see list end of checklist).
9. Describe any off-site runoff pattern existing at the site.

VIII. Air Pathway

1. Estimate number of people within 4 miles (city or county records).
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
2. Shortest distance from source to occupied building.
3. Identify known releases to air.
4. Identify reports of adverse health effects.
5. Identify existence of sensitive environments within 4 miles (see end of checklist for list).

Miscellaneous Inquiries

1. Are any additional aerial photographs depicting site history available?
2. Meteorological data.
3. Nearest recreational area? Hospital?
4. Local water supply sources?

Site Sketches to Include

1. Date(s) of visit.
2. Well locations (including nearest to site).
3. Storage areas (past and present).
4. UST and above ground storage tanks.
5. Waste Areas.
6. Buildings
7. Access roads.
8. Areas of ponded water, or depressions in surface.
9. Drainage direction.

Site Reconnaissance Checklist, continued

10. Photograph locations and directions.
11. Vegetation and significant landscaped features.
12. Any irregular appearance for soil, vegetation, tanks, etc. such as may result from spill, backfill operation, recent dirt moving work, etc.